Historic England

War Memorials Trust

The Conservation, Repair and Management of War Memorials

Summary

This guidance is intended for anyone interested in or responsible for the care of war memorials. This might include parish, local and district councils, conservation professionals, contractors, statutory bodies, volunteer groups or private owners. Although the guidance covers the setting of war memorials, more detailed information on landscape issues can be found in the publication *The Conservation and Management of War Memorial Landscapes*. When it refers to 'custodians', the document is addressing anyone who has taken on formal responsibility for a war memorial, whether or not they are its legal owner.

The guidance describes current best practice on the understanding, assessment, planning and implementation of conservation work to memorials as well as their ongoing maintenance and protection. It also outlines the legal frameworks and statutory duties that relate to their ownership and care.

War memorials have always had a deep emotional resonance with the people of this country. Whether on a national, civic or local level, they act as constant reminders of the ultimate price of war – collective monuments to the many lives lost as well as a means of remembering the names of the individual servicemen and women who paid that price.

The majority of war memorials date from the 20th century, and most of those from the years after the First World War. National and city memorials were generally monumental in concept and size but in towns and villages they tended to be more modest in style. Whatever their appearance, they continue to act as focal points for the commemoration of those killed and affected by war and as places for reflection on the effects of their loss on a community and society as a whole.

In addition to their continuing commemorative role, many war memorials are of significant architectural, historic or artistic quality and have become key parts of the historic environment; it is therefore important that their physical condition should be safeguarded for the benefit of future generations as well as our own.

This guidance has been written and compiled by David Odgers with assistance from David Pickles, Amy Davidson, and Tiva Montalbano.

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HistoricEngland.org.uk/warmemorials

Front cover
top left: Work in progress: touching in lettering to enhance the legibility of the names.
[photo © Humphries & Jones]
top right: This differential staining is typical of exposed bronze statuary. Most of the surface has developed a natural patination but the original bronze colour is visible in protected areas. There is also staining from bird droppings and water run-off.
[photo © Odgers Conservation Consultants Ltd]
bottom: High pressure steam cleaning (DOFF) to remove degraded wax, paint and loose corrosion products, prior to patination.
[photo © Rupert Harris Conservation Ltd]

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01

02

Images 01 and 02

01. Rickerby Park was purchased as a joint war memorial for the counties of Cumberland and Westmorland. As well as the wider memorial park, a memorial bridge and cenotaph to the fallen of the First World War were constructed within the park. It is listed Grade II and is constructed of granite. Above an incised inscription there are County, Town and regimental badges; it was unveiled in May 1922.
[photo © Carlisle City Council 2011]

02. This memorial in Warlingham, Surrey is one of many thousands erected in public spaces in towns and villages after the First World War. This example includes an additional plaque added after the Second World War.
[photo © Paul Dyer 2013]

1 Definition

War Memorials Trust defines a war memorial as "any physical object created, erected or installed to commemorate those involved in or affected by a conflict or war". Although a war memorial might usually be thought of as a plaque, a freestanding cross or perhaps a bronze statue of a soldier on a pedestal, this definition allows for a vast array of different types.

The full range of memorials in the United Kingdom can be seen on War Memorials Online (www.warmemorialsonline.org.uk) as well as researched through the Imperial War Museum's War Memorials Archive (www.iwm.org.uk/warmemorials). A brief search will show their astonishing diversity, including locomotives, trees, drinking fountains, chapels, windows, gardens and complete streets. Many of them were paid for by public subscription but the fact that they are memorials may no longer be immediately apparent; for example a large number of churches have either a single or a complete peal of bells that were either cast or recast as memorials, usually after the First World War.

It is not possible within the scope of this guidance to cover all the different types of memorials, so the focus is on those that are most commonly seen across the country and which are still likely to play a part in ceremonies of remembrance. These include plaques, crosses, obelisks, cenotaphs, sculpture, arches and lych-gates.

Memorials that are attached to or inside buildings are also included, but complete buildings such as chapels, hospitals and community halls along with objects such as windows, organs, rolls of honour, flags and seats have been excluded. However, some of the approaches covered in this guidance are still relevant; advice on the care of individual artefacts or historic fabric can be found through the Conservation Register (see Section 16 – Where to get advice).

Official First and Second World War graves and cemeteries (and associated memorials within them) come under the jurisdiction of the Commonwealth (formerly Imperial) War Graves Commission, which was established in 1917; they do not form part of this advice note. Graves of other types are also not covered; for advice on their maintenance and repair additional guidance *Caring for Historic Graveyard and Cemetery Monuments* (2011) has been published..

This advice note is directed towards memorials in England and some topics (such as legislation) may be specific to England. However, in general, the principles will be relevant to memorials in all parts of the UK.

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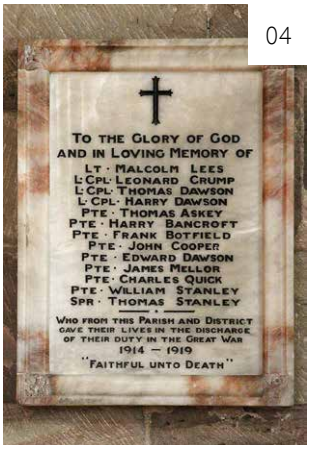

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Images 03–08: the range of memorial types.

03. Gateway, Sherwood.
[photo © Paul Sephton 2012]
04. Plaque, Acton Trussell.
[photo © Clive Gilbert 2011]
05. Drinking fountain and horse trough, Allendale.
[photo © North East War memorials Project]
06. Wheel cross on pedestal, Church Langton.
[photo © East Langton Parish Council 2013]
07. Small obelisk, Barton St David.
[photo © Odgers Conservation Consultants Ltd]
08. Cenotaph, Watts Park, Southampton
[photo © War Memorials Trust 2009]

2 Best Practice

2.1 Overview

Deterioration as a result of weathering, structural movement or human intervention is an inevitable part of the history of any memorial. Its conservation or repair should be a logical process that aims to reduce or remove the causes of deterioration, address any causes of structural instability and provide physical security. It should at the same time seek to preserve as much as possible of the historic significance, design and original material of the monument.

Ongoing care and effective repair can be achieved by working through the defined steps set out in this document:

Historical research (Sections 4–5) Before any conservation work can be considered, it is essential to discover what background information there is on the memorial. This means not only researching its history but also understanding the extent, nature and significance of its surroundings and being aware of any restrictions or legislation which apply to it.

Materials, diagnosis and recording of condition (Sections 6–9) Each memorial is unique in its construction, location, environment and state of deterioration. The next step must therefore be to investigate the materials used in its construction and carry out an evaluation and assessment of its present condition. This assessment needs to be properly recorded so that it provides information for subsequent inspections.

Practical treatment (Sections 10–12) Once the condition and significance of a memorial is understood, a considered judgement can be made about the amount of cleaning, conservation or repair that it needs. This treatment should always use materials that are suitable in terms of performance and working properties. No intervention should ever attempt to alter the original intended appearance of the memorial. In general, a temptation to restore a memorial to a pristine condition should also be avoided, as the methods needed to achieve it are likely to be damaging.

Any proposals must also take account of the wider values that people associate with the memorial. For example, specific consideration will need to be given to any dedications or rolls of honour which provide a memorial with much of its intrinsic historic and evidential significance. For this reason, it may be legitimate to take a more flexible approach to the restoration of inscriptions than would be appropriate for other types of historic monument.

Commissioning conservation work (Section 13) Once the nature of the works has been identified, best practice includes commissioning them through a tender process and selecting a contractor with the necessary skills to carry them out to a high standard.

Management and maintenance of war memorials (Section 14) Regular maintenance is the best way of preserving a memorial, and especially one that has already been conserved or restored. It reinforces the need for regular inspection and identifies maintenance activities that need to be carried to prevent more serious damage and decay.

Contacts, references and further reading (Sections 15 and 16). The guidance concludes with details of where to apply for grants, how to contact the various bodies mentioned in the text and what to read to learn more about the topics dealt with above.

See also Condition Survey template and Care Cycle.

2.2 Role of professionals and volunteers

Many aspects of the repair and maintenance of war memorials, especially those involving complex structures, require professional involvement. Architects or surveyors are needed to inspect larger or more sensitive structures. In cases of structural instability, the services of a structural engineer will also be required. All such professionals should be conservation-accredited by their professional body.

Specialist conservators should be engaged to evaluate the condition of the materials, and carry out and supervise complex treatments. Excellent practical skills and thorough knowledge of the materials are essential to carry out repairs to the required standard, so craftsmen and conservators with suitable experience should always be used.

Successful projects are based on a collaborative approach between professionals, craftsmen and client. Details of where to contact suitable professionals are given in Section 16: Where to get advice towards the back of this publication.

Volunteers are important in maintaining continuity of local involvement in the memorial and are invaluable in any fundraising. They can also carry out much of the research into memorials and make sure that a separate record of names exists. They can help with regular monitoring of the memorial and the production and updating of condition surveys. Members of the local community also have a crucial role to play in tackling some routine maintenance work such as pruning invasive vegetation.

Image 09

Until the 19th century, most memorials were to individual officers although, as with this one in Trafalgar Square, they may also acknowledge the sacrifice of the serving soldier.
[photo © Odgers Conservation Consultants]

3 History and Development of War Memorials

"War Memorials are the great blessing of the English. Culturally, they are their finest creation"; so wrote A A Gill in his chapter on memorials in *The Angry Island: Hunting the English* (2004). But the appearance of war memorials as an almost universal feature of village and town is comparatively recent. Although the history of Britain is full of conflict and war, it was only in the late 19th century, and especially after the First World War, that they became commonplace; there are now estimated to be more than 100,000 in the UK.

3.1 Pre-First World War memorials

From the 17th century onwards, commemoration of leaders and individual officers was relatively commonplace. It might take the form of a statue in a town centre or a plaque or monument inside a church; occasionally there were acknowledgments to the common soldier and there are some memorials specific to regiments.

It was the Second Boer War in 1899 that gave impetus to the creation of the war memorial as a commemoration of the dead rather than a celebration of victory. At least 1,800 of these were constructed and they are generally of high architectural quality: they were often designed by noted sculptors as statuary was a common form. This desire for commemoration arose for two reasons; firstly the increasing public awareness of what was going on that resulted from the eyewitness accounts of reporters and, secondly, the substantial reforms in the way in which the army was run. Regiments were now composed of skilled, mostly literate, volunteer soldiers recruited from local communities and so the impact of any deaths was keenly felt at a local level.

3.2 First World War memorials

The scale of the loss of life in the First World War was, and remains, almost too great to comprehend. Every community in the land was affected. It was government policy not to repatriate the dead but instead to create war cemeteries on or near the battlefield. Many of those who died had no known grave and often the body could not be identified. The relentless rows of simple headstones that can be found in the cemeteries maintained by the Commonwealth War Graves Commission and the larger architectural memorials (such as the Menin Gate designed by Sir Reginald Blomfield, the Thiepval Memorial designed by Sir Edwin

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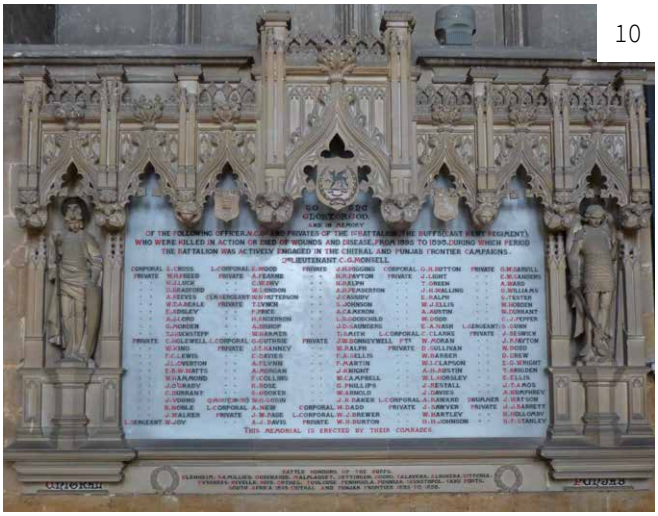

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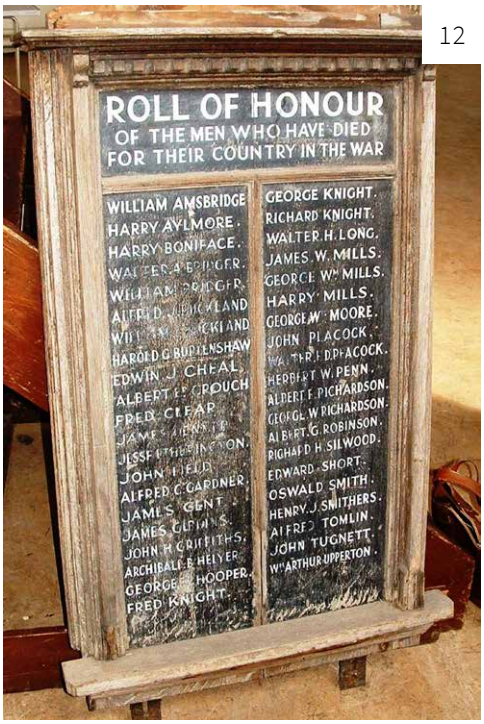

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Images 10–14

10. Regimental memorials were often situated in churches and cathedrals. This one in Canterbury Cathedral identifies individual soldiers, but many others do not.
11. The Commonwealth War Graves Commission is responsible for the care of battlefield memorials all over the world. The shape of the gravestone was designed by Sir Edwin Lutyens.

12 & 13. At Littlehampton Sussex, a very simple timber plaque was created soon after the First World War. It was then replaced by a larger town memorial that stands on the edge of the green to the south of the town centre. The new memorial contains the 236 names listed by rank, surname and initials, including all those on the original commemorative plaque. There have been subsequent additions on separate panels around the base. The unveiling and dedication of the memorials took place in September 1921.
[photo 12 © Littlehampton Museum]

14. This memorial was unveiled in Battersea Park in October 1924 to commemorate more than 10,000 men who had been killed or listed as 'missing presumed dead' whilst serving with the 24th Infantry Division. It was designed and sculpted by Eric Henri Kennington RA and consists of the figures of three infantry soldiers with helmets rifles and full kit, with a serpent at their feet. The figure to the left was modelled on the poet and writer Robert Graves.
[photo © War Memorials Trust 2014]
[all other photos © Odgers Conservation Consultants Ltd]

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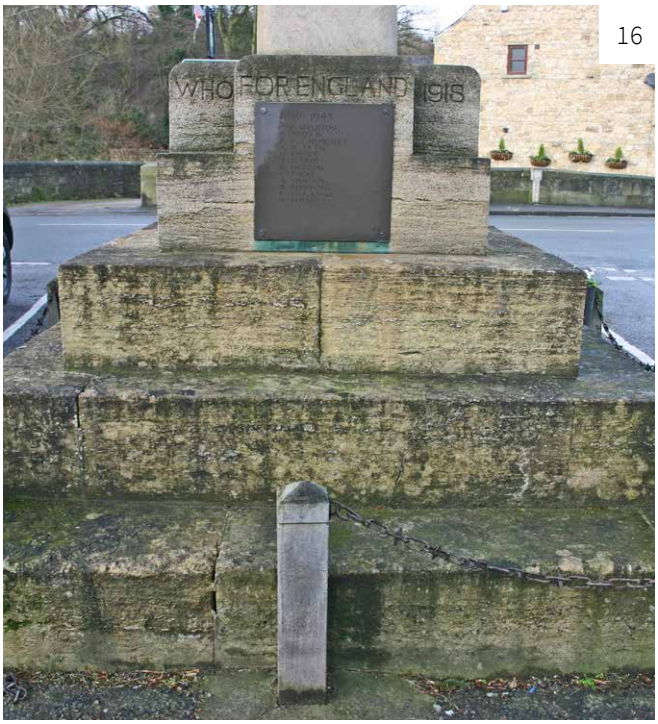

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Images 15 and 16

15. The Royal Artillery Memorial is dedicated to the men of the Royal Regiment of Artillery who died in the First World War. Described by the architectural historian Nikolaus Pevsner as a 'masterpiece of British 20th century sculpture', the monument (erected in 1925) was designed by the sculptor Charles Sargeant Jagger with the architect Lionel Pearson. Jagger had served in the First World War and his work offers an uncompromising and unsentimental depiction of the reality of life and death on the battlefield.
16. Although there are many memorials dedicated specifically to the dead of the Second World War, it was quite common for existing First World War memorials to be amended, such as this addition of a bronze plaque to an existing obelisk.
[photo © Odgers Conservation Consultants Ltd]

Lutyens and the Tyne Cot memorial designed by Sir Herbert Baker) are poignant reminders of the sacrifice made by so many.

However, the communities at home also wished for a physical place at which they could express their grief and make their own act of remembrance. At first, temporary shrines were set up but, once the war was over, there was a need for more permanent structures. In 1919, the Royal Academy organised a 'War Memorial Exhibition' which provided advice for those who wished to erect a memorial as well as providing a catalogue with suggested designs.

No national funding was available for local and civic memorials, so they were commonly paid for by public subscription or sometimes private donation; most date from the early 1920s. Although the design was often constrained by the availability of funds, the extraordinary artistic and architectural variety of the memorials is testament not only to the national need for commemoration but also to the designers and craftsmen who created them and the generosity of subscribers, donors and patrons. By 1930, almost every village, town, city, place of work, school, church and club had a memorial of some description.

Once designs had been established and funds raised there was an additional difficulty in the practical completion of the memorial. The loss of life in the First World War resulted in significant depletion of skilled craftsmen – whether quarrymen, masons, letter cutters or bronze founders – and the range and quality of materials (particularly for concrete) was depleted. Despite this, it is widely recognised that the creativity associated with the design and construction of First World War memorials gave us one of the great collections of English cultural artefacts.

Notable sculptors and architects were often commissioned to carry out the works, particularly for larger memorials. This resulted in works of outstanding and lasting merit, albeit ones which attracted a degree of controversy with regard to the way in which artists depicted the horror of war (for example the Royal Artillery War Memorial at Hyde Park Corner by Charles Sargeant Jagger)

Image 17

This work by Stanley Spencer was painted in 1921 and is titled ‘Unveiling a war memorial at Cookham’. This was typical of the many memorials being unveiled around the country at this time.

[painting © The Estate of Stanley Spencer 2013. All rights reserved DACS]

or made political statements (for example the University of Leeds war memorial by Eric Gill).

These were, however, exceptions and smaller memorials tended generally to be simple in style. Many of those found on the streets, open spaces and churchyards of towns and villages took the form of a cross. The obelisk (whose use as a symbol of commemoration dates back many centuries) was also used as a design that could be easily carved and erected. In both cases, the plinth (often approached by a number of steps) provided a suitable space for listing the names of the dead. Further embellishments, such as a superimposed sword or statuary were used on some larger memorials.

There were, of course, many different designs both of freestanding memorials and those that were incorporated into existing buildings. Each is different, not only because of those commemorated but also due to the materials used, the method of construction and the location. Materials used (especially for smaller memorials) were often local or regional and this too influenced the design. As a result, certain types of memorial are more common in certain parts of the country than others, adding to their local identity.

Although a fundamental requirement was for part of the memorial to be available for the inscription of names, there was sometimes insufficient space to record the large numbers of the dead from some towns and cities. In such cases, a general dedication was inscribed on the memorial and the individual names were recorded in a Book of Remembrance that was kept at a location readily accessible by the community, such as the town hall or parish church.

3.3 Second World War memorials

The Second World War resulted in less prolific memorial construction. Mostly this was due to the re-use (by adding plaques or further inscriptions) of First World War memorials. However, the bombing of cities and towns in England meant that there was a much greater loss of civilian life and the changing nature of warfare meant that the casualties from the RAF and the Royal Navy were much higher. As a result, there are many hundreds of specific Second World War memorials and new ones are still being commissioned. Many of these adopt traditional designs (such as crosses, pedestals and statuary) but there was also a tendency to a more modernist appearance using different materials and objects related to those commemorated –for example anchors, buoys and propellers.

3.4 Modern war memorials

Loss of life in subsequent conflicts (for example Suez, Falklands, Iraq and Afghanistan) continues to be commemorated mostly by adding names to existing memorials although again a number of new memorials have been commissioned. The Armed Forces Memorial, at the National Memorial Arboretum in Staffordshire, commemorates all service personnel killed in conflict, on duty or through terrorist action since the Second World War.

4 Legislation

War memorials are treated like any other structure in terms of legislation and there are no specific rules which apply to them.

4.1 Ownership

War memorials were often paid for by public subscription and the committees that organised their construction were disbanded on completion of the works. This means that it is often difficult to establish ownership and it is not always possible to identify who has responsibility for maintenance.

For some memorials, formal transfer of ownership took place but in many cases the local community, church or local council will have assumed responsibility for the upkeep. In order to clarify the issue of responsibility, *The War Memorials (Local Authorities' Powers) Act 1923* empowered local authorities to use public money for the maintenance, protection and repair of war memorials. This statute was amended in 1948 to change the emphasis from memorials 'which may be vested in them' to 'whether vested in them or not'. It also allowed for the addition or correction of names.

Subsequent amendments have tried to encourage the upkeep of memorials by removing the need for parish councils to get permission to spend money on maintenance (*Parish Councils Act 1957*). However, it still remains the case that no organisation is obliged to take responsibility for a war memorial in its district or community.

This doubt over ownership means that some research is essential before any work to a memorial is contemplated. Most relevant information is held locally so parish records, local and county archives and newspapers should be contacted; information may be available online at the local library. It is also always worth contacting the local authority Conservation Officer to establish whether they have any involvement with a particular memorial. There are national sources of information to check such as War Memorials Online and the Imperial War Museums' War Memorials Archive, both of which may hold relevant information about who holds responsibility for the memorial. In general, if a memorial is on public land it is recommended that the local council is contacted in the first instance; if a memorial is located on church grounds then it is best to try the church officials first. War Memorials Trust (www.warmemorials.org) has helpsheets on *Ownership of War Memorials* and *Researching the History of a War Memorial* which can provide further guidance.

The need to research ownership remains paramount because as well as legal consents, permission for any works will be required from the person, community, regiment, local authority or other organisation that owns or erected it.

4.2 Designation and war memorials

Listed buildings

Many war memorials are included in the National Heritage List for England, which is drawn up by Historic England for the Secretary of State for Culture, Media and Sport. Listing celebrates

buildings and monuments of special architectural or historic interest and encourages sympathetic and sustainable management. Regardless of whether listed at Grade I, Grade II* or Grade II a memorial is thereby legally protected and any proposed work may require Listed Building Consent from the local authority. Listed Building Consent helps ensure that any proposed changes maintain the monument's significance and that appropriate methods and materials are used in any repair. Many more deserve to be added to the list but in some cases, local listing can help to secure the same end.

Conservation areas

The environment within which a war memorial is set is an important component of its intrinsic value (see Section 5 – The setting of war memorials). In some cases, the memorial may be situated in a conservation area designated by

What consent might be required for works to a war memorial in England?			
	All memorials	Memorials that are Listed Buildings or near Listed Buildings	Memorials that are Scheduled Monuments or within a scheduled area
Type of legal consent	Planning Permission	Listed Building Consent	Scheduled Monument Consent (SMC)
Who is responsible for issuing the consent?	Local Planning Authority	Local Planning Authority	Historic England
When is consent needed?	Works which constitute development defined as 'the carrying out of building or engineering or other operations in on under or over land or making of any materials change in the use or any building or other land'. This includes putting up new structures, rebuilding, alterations or additions to structures and demolition within a conservation area	Works that would affect the special architectural or historic character of a listed building or structure. Even if a memorial is not listed in its own right, it could be within the curtilage of a listed building. This means it has been within the grounds of the building since before July 1948. If it is considered within the curtilage, it is treated the same as if it was listed in its own right	Any works that would affect the special character of the monument. This consent takes precedence if a monument is also listed
Examples of types of work	Construction of new elements/ materials, relocation	Relocation, new work, alterations	Virtually all work, including maintenance
When is consent not needed?	Maintenance work that does not materially affect the appearance	Maintenance and like-for-like repairs unless they affect the character of the structure. Ecclesiastical exemption for certain denominations	Any work is likely to require SMC
Advice available from	Local Planning Authority	Local Planning Authority Conservation Officer	Historic England

Table 1
Summary of the types of consents that may apply to war memorials.

the local planning authority as being of special architectural or historic interest, the character or appearance of which it is desirable to preserve or enhance; the memorial may contribute to this interest. Permission to carry out demolition to all or part of a memorial (whether listed or not) within a conservation area must be obtained from the local authority through the Planning Department; relocation would be considered as a type of demolition.

Scheduled monuments

Statutory protection is also given to those war memorials that are, form part of or are attached to scheduled monuments (monuments and archaeological remains considered to be of national importance). Scheduling is the responsibility of the Secretary of State for Culture, Media and Sport supported by advice from Historic England from whom Scheduled Monument Consent (SMC) must be obtained before any work, even maintenance, is undertaken.

Ecclesiastical exemption

A number of Christian denominations (Church of England, Roman Catholic Church, United Reform Church, Methodist Church and Baptist Union of Great Britain) are exempt from the requirement to obtain listed building consent for works and instead have their own internal system of permissions. In the case of The Church of England, this is called a 'faculty' and is granted by the Diocesan Chancellor. Ecclesiastical Exemption (which applies only to churches in use) can be complicated so it is advisable to check with the church and local authority whether any other consents are required. It should be noted that the Ecclesiastical Exemption only relates to listed building consent and does not remove the need to obtain Planning Permission should that be required.

Other designations

Memorials may be situated in landscapes that could be subject to other designations. These include:

- Registered Historic Park or Garden
- Registered Battlefield
- Green Belt
- National Park
- Area of Outstanding National Beauty
- Urban Park or Green Space
- Common Land
- Registered Village Green
- Public Right of Way
- Site of Special Scientific Interest (SSSI)
- World Heritage Site

The local authority planning department can provide further information on whether a memorial is subject to restrictions imposed by these protections. Further information can be found in the guidance *The Conservation and Management of War Memorial Landscapes*.

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Images 18–21

18 & 19. The Cenotaph in Whitehall was designed by Sir Edwin Lutyens and erected in 1920 to replace a temporary structure of wood and plaster that had been constructed for the Armistice celebrations in 1919. It is the principal focus for commemoration in England and is listed Grade I for its exceptional national interest.
[photo 18 © BL25601 Reproduced by permission of English Heritage]
[photo 19 © Odgers Conservation Consultants Ltd]

20. The Hoylake and West Kirby memorial has been listed Grade II* for two main but unconnected reasons: it was the first commission of Charles Sargeant Jagger and it is also is situated in a dramatic setting at the top of Grange Hill overlooking Liverpool Bay.
[photo © Peter Jackson-Lee 2008]

21 This unusual cloistered war memorial at Blackmoor in Hampshire was built in 1920 and is listed Grade II. It was commissioned by the Earl of Selborne and his wife in memory of their second son who was killed in action in Mesopotamia in 1916. The memorial was designed by Sir Herbert Baker and the copper wall plaques by Sir Charles Wheeler.
[photo © War Memorials Trust 2010]

5 The Setting of War Memorials

The physical structure of a war memorial is fundamental to its role in commemorative events and within the community but its setting plays an important, and occasionally dominant, role in determining its significance.

The setting of a memorial includes not just its immediate surroundings but also its wider context. For example, a memorial might have been constructed at a quiet location but subsequent development – such as housing or road building – may have changed the experience of visiting it. Details can be found in the Historic England publication *The Setting of Heritage Assets*.

The setting is likely to be more extensive than the curtilage – the legal term for the area around the memorial that is defined by factors such as ownership, physical boundaries and functional association. Those taking responsibility for the care of a war memorial will normally only be able to control its condition within the curtilage; influencing changes in its wider environment may be more difficult. In some cases small changes can be made in the vicinity of the memorial to counteract larger impacts within the wider area; for example, it may not be possible to change the layout of a busy road but a hedge could be planted to shield the memorial from it.

In many towns and villages, memorials are set within small areas of grass or paving, perhaps surrounded by a wall, planting or railings. Simple though these settings might seem, they can still be crucial to the way in which the memorials are viewed and the atmosphere in which they are experienced. Memorials situated within churchyards are often set within their own small curtilage within the larger landscape. The surroundings of some larger memorials may have been extended to include areas of hard landscaping, memorial gardens, avenues of trees and even playing fields.

It is important to identify and understand any features which are part of the setting of the memorial, whether immediately adjacent to it or part of a larger design. This recognition will allow these features to be considered in any plans for maintaining, repairing or making changes to the memorial. Further information is available in the Historic England publication *Understanding Place: Conservation Area Designation, Appraisal and Management.*

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Images 22–24

22. This war memorial is located on Park Road in Bestwood Village, Nottinghamshire. It has a well-defined curtilage which includes the hedge, railings and paving.
[photo © War Memorials Trust 2011]
23. Ripon's war memorial is located within the Spa Gardens. The memorial is listed Grade II and also located within a conservation area.
[photo © Friends of Spa Gardens 2011]
24. Many memorials are set within churchyards and thus become part of the curtilage of the church. In this case at Ashton Keynes, the old churchyard cross has been re-used (and partly replaced).
[photo © Odgers Conservation Consultants Ltd]

6 Principal Materials Used in War Memorials

Most war memorials are constructed (at least in part) out of stone but other common materials include metals, timber, brick and concrete. Often there will be more than one material involved, including mortar which has a vital role in the construction of many memorials.

It is an essential prerequisite to any condition survey that the materials are correctly identified; it is important not only to identify sub-groups within each material type (for example sandstone and limestone, hardwood and softwood) but also to find out from a specialist the specific type of sandstone or the exact variety of softwood. This is because the choice of treatment will depend on understanding their distinct physical and chemical properties and how they react to agents of decay.

6.1 Stone

England has an abundant and varied legacy of stone. Indigenous limestones, sandstones, slates and granites, as well as imported marbles, are all frequently found in war memorials. Small village memorials will often have been made from local stones, many of which may no longer be available. Correct identification may require a detailed archive search or even the input of a geologist.

Limestone

A sedimentary rock largely made of calcium carbonate (often in the form of crushed shells or round grains called oolites). It is found mainly in the Midlands and south of England and is generally soft enough to be worked by hand. Minerals such as clay and iron can change the appearance and characteristics of the stone considerably. Its durability will also be affected by the way in which it is used (especially the orientation of the natural bedding plane) and the degree of weathering to which it is exposed. The colour and texture of limestone varies from the even, fine texture of pale grey Portland (Dorset), through to the rich, warm, yellow, open texture of Ham Hill (Somerset). It has been used for almost all components of memorials, including steps, ashlar blocks and columns, as well as for decorative and carved elements.

Sandstone

A sedimentary rock found most commonly in the north and west of England. It varies considerably in texture, durability and colour – from the deep red of St Bees (Cumbria), to the pale cream of Stancliffe (Derbyshire). These differences in appearance and behaviour derive from the way in which different grains (mainly quartz but also clay, feldspar, mica and glauconite) are

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Images 25–28

25. This memorial at Ravenstone, Leicestershire is made from Weldon limestone with a slate inscription. The porous surface of the stone and the surrounding trees and shrubs create an ideal environment for the growth of algae and other vegetation.
[photo © Skillington Workshops]
26. This memorial at Tiverton, Cheshire is made from a red sandstone which is porous and encourages the growth of algae and other microbiological material. Sandstone also tends to darken after prolonged exposure to rain.
[photo © Tiverton and Tilstone Fearnall Parish Council 2011]
27. The war memorial at Canwick, Lincolnshire is sited in the church grounds; the nature of the limestone allows for finely carved detail. The monument is square in plan and is unusually ornate with an open pointed arch to each face.
[photo © Skillington workshops]
28. Situated on the village green at Gildersome near Leeds, this granite memorial appears massive; its large, mostly plain, blocks are typical of the use of this hard material.
[photo © Odgers Conservation Consultants Ltd]

bound together by the natural cement of the stone (mostly quartz but also calcite and iron compounds). The mineral content and the type of cement give rise to the geological terminology such as argillaceous sandstone (containing significant amounts of clay) or calcareous sandstone (quartz bound together by calcite). Like limestone, it is a versatile material which can be used for almost any purpose on a memorial. Although many sandstones appear durable, they are susceptible to weathering and deterioration.

Granite

The most common form of igneous rock found in Britain. It is coarse-grained and mainly formed of quartz, feldspar and mica crystals. These provide the typical flecked appearance and colouring that varies from pink to grey. It is mainly sourced in Devon, Cornwall and Scotland. Granite is dense and durable but because it is difficult to cut using hand tools it is rarely used for fine carving. It can be polished or left with a rough tooled surface finish. In memorials it tends to be used for substantial elements such as columns, plinths and crosses.

Slate

A metamorphic rock naturally found in several regions of England. At one time the Midlands contained many slate quarries but these are now redundant, though other sources in Cumbria and Cornwall are still active. Slate is formed from the recrystallization of fine-grained sedimentary or igneous rocks under extreme pressure or temperature. It is extremely durable and fine in texture but its layered structure makes it liable to de-lamination (flaking). It is often used for inscription panels.

Marble

A metamorphic rock that has a close-formed matrix composed mainly of calcium carbonate, with mineral inclusions that impart colour. There are no true marbles from England, only limestone that can be polished, such as that from Purbeck (Dorset). The marble found on memorials is therefore imported and consequently expensive. It is usually finished to a fine polish and was often used for inscription panels or sculpture. Perhaps the most common marble encountered is white Carrara from Italy; its purity of colour and fine-grained texture made it ideally suited for detailed carving. External marble is susceptible to weathering, particularly through sugaring of the surface.

6.2 Metals

The term ‘metal’ is used to describe both the pure element (iron, lead, copper) and also mixtures of them (alloys such as brass and bronze). Each metal or alloy has its own characteristics and mechanical properties such as malleability, brittleness and hardness. These derive from the composition and structure of the metal and from the methods used in refining and forming it. Treatments and coatings can also be used to manipulate the surface appearance of metals. All of these attributes have contributed to the widespread use of metals in war memorials.

Bronze

A composite material formed mostly from copper (85–90%), tin (10%) and traces of lead (<1%). It is harder than copper but can be cast. It therefore is used primarily for ornamental detail applied to stone memorials, such as crosses, swords or sculpture. The precision of the casting also allows it to be used for inscriptions. The colour will vary due to artificial patination or natural weathering but the products of corrosion, such as copper sulphate (verdigris), are common and water run-off can stain the surrounding stone. Bronze is durable but because of its sensitivity to corrosion from air, water and pollution it requires regular, but low-level, maintenance.

Brass

An alloy formed from copper (typically 70%) and zinc (30%) and sometimes with other added elements such as tin, nickel or lead. It is harder than copper but softer than bronze. It has a familiar bright surface that can take a high polish but it is susceptible to oxidation. Its main use on war memorials is for inscription panels, particularly in internal locations; these commonly have the incised lettering painted or enamelled.

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Images 29–32

29. This memorial at Weymouth, Dorset displays the two most common uses of metals in war memorials – bronze panels and iron railings.
[photo © Humphries & Jones]
30. Bronze statuary was cast in foundries usually by the lost-wax method which allowed the production of multiple copies.
[photo © Odgers Conservation Consultants Ltd]
31. In this memorial at Beverley, metals were used to construct models including a contemporary biplane, a military tank and a writing instrument. However, the only remaining model is a ship (see Image 32); an example of the way in which theft can significantly affect a memorial.
[photo © Skillington Workshops]
32. Small modelled ship (see Image 31)
[photo © Skillington Workshops]

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Images 33–36

33. This carved wooden sculpture at St Bartholomew's churchyard, Low Cam, Dursley is known as a Calvary because it represents the scene of the crucifixion of Jesus. [photo © Ceri Jones 2011]
34. The war memorial in the LB of Hounslow was constructed in 1976 and consists of a simple concrete obelisk with a dedicatory plaque on the front face; it is surrounded by railings and is located within a conservation area. [photo © London Borough of Hounslow 2008]
35. The Sparsholt and Lainston war memorial in Hampshire commemorates the dead of both world wars. Although there are stone and timber elements, it is constructed principally of brick because the area has a long history of brick manufacture. The memorial is not listed but is located within a conservation area. [photo © Sparsholt Memorial Hall 2011]
36. This memorial has suffered from some slight structural movement that has caused disruption between adjacent stones. As a result the joints have opened, sometimes by 25mm or more. These joints have been filled with a cementitious mortar that has different physical properties to the surrounding stone, allowing further cracking and the ingress of water. This will contribute to ongoing deterioration of the stone. [photo © Skillington Workshops]

Iron

A durable, adaptable and relatively inexpensive material, making it a popular choice for both the construction and decoration of memorials. It was typically used for surrounding railings or gates, many of which were removed and recycled during the Second World War. Iron was also used widely for fixing masonry elements either to one another or to a core.

The main types of iron encountered in memorials are 'wrought' and 'cast'. Wrought iron is relatively pure and forged by heating and then pounding it into shape on an anvil. It is malleable and can be distinguished from cast iron through details of its manufacture – ends are often tapered and individual units are fused together or secured to each other by using a metal collar or riveting.

Cast iron, actually an alloy of iron and small amounts of carbon (2–4%), became increasingly popular from the 18th century onwards due to the ease and economy of its mass production. It is made by pouring molten ore into a mould and then removing the cast once it has cooled. The addition of carbon made it more brittle than wrought iron but it is nevertheless easily machined and is strong in compression. Individual units can only be joined through soldering or brazing. As long as the paint on iron is maintained it requires little other maintenance.

Lead

An extremely soft, flexible metal, which is both its appeal and its weakness. It is very heavy and stable, although the surfaces quickly oxidise to a dull grey colour. It was occasionally used in war memorials for lead statuary (usually reinforced with iron armatures) but it is most commonly found in applied lettering and as a flashing material.

Copper

A very ductile, malleable and conductive material that resists corrosion. Its principal use in war memorials is as the main constituent of bronze and brass although it is sometimes used as a roofing material on memorial buildings.

6.3 Timber

There are many examples of the use of timber in war memorials, often as a backing for internal bronze or brass inscriptions. Inside churches it was often used for commemorative choir stalls, lecterns and screens. The choice of timber would depend on cost and availability. Although English oak was commonly chosen for its traditional durability and even grain, good softwood such as pitch pine or imported hardwoods, most commonly mahogany, were also used. Indoor timber memorials are normally waxed and polished and well maintained.

The external use of timber is widespread but much more problematic in terms of conservation. It is sometimes used for the construction of crosses, typically in the depiction of Calvary (a figure of Christ on the Cross usually under a pitched roof) as well as for other sculptural purposes. Oak is a popular choice, often in conjunction with another material, a typical example being a stone plinth. The widest use of timber, however, is in lych-gates, a great number of which were either constructed as memorials or dedicated as such. These timber-frame constructions are usually set on a stone or brick plinth and may have additional materials (such as brick) incorporated into the structure. They often also include decorative elements such as carved bargeboards and may feature inscription plaques inside, commonly of brass or bronze. Roofs are sometimes covered in timber shingles although clay or slate tiles are more usual.

In many cases external timber will have been treated; depending on the use and location, this might be with preservative, stain, oil or varnish. All of these will have some effect on the appearance and subsequent behaviour of the timber.

6.4 Brick

Brickmaking involves the vitrification and crystallisation of clay minerals when heated (usually to 900–1200°C); these processes give a hard and rigid structure to the material.

Up until the 19th century, brick manufacture in England was a localised process that gave rise to regional variations. With mass production and the improvement in transport during the Industrial Revolution local manufacture generally disappeared although there are still some small brickworks which use traditional handworking methods.

Brick was used extensively for war memorials, but mostly in the form of complete buildings such as memorial halls, hospitals, gateways and bus shelters. Falling within the remit of this advice note is brickwork used for walls and plinths of memorials but more commonly in conjunction with timber on lych-gates, either as the base for the frame or sometimes as infill panels. For presentational reasons, 'facing' bricks will normally have been used. As well as offering consistent colour and texture they may also be arranged in decorative patterns.

The behaviour of bricks will depend not only on the type of clay used in the manufacture but also on the way in which they have been used (where and with what types of bonding) and the nature of the mortar between them.

6.5 Concrete

Concrete is a porous composite material consisting, in its simplest form, of a cement binder combined with aggregates and sand. The properties of the concrete can be varied (by methods of batching, mixing, placing and compacting) and the surface can be changed by techniques of finishing or by application of coatings such as paint.

Concrete used without reinforcement is termed mass, or plain, concrete and has the structural properties of great strength under compression and almost none under tension (stretching). If it is to be used to span any distance, steel (colloquially known as 'rebar') is included to form reinforced concrete.

Because of its cheapness and ability to set in wet conditions (including under water), concrete was originally confined to engineering applications such as foundations and utilitarian structures such as docks, roads and canals. However, the architectural, sculptural and design possibilities of concrete developed steadily throughout the 20th century and into the 21st.

In the aftermath of the First World War, a shortage of steel, bricks and timber caused concrete to be incorporated into a number of war memorials. Some of the larger memorials have concrete foundations and others have concrete cores to which more expensive materials (such as stone and bronze) have been fixed. Some memorials have concrete hard standings or pillars around them. There are also examples of cast-concrete sculptures, plinths and obelisks. In most cases, there is likely to be some sort of iron reinforcement or armature, which plays an important part in the behaviour of the concrete.

6.6 Mortars

Mortars play an important part in any masonry structure and their nature has an important effect on the behaviour and appearance of a war memorial.

Lime mortar

Historically mortars were made using a lime binder obtained from firing limestone in a kiln at about 900°C and slaking the resulting 'quicklime' with water to produce lime putty. This was then mixed with sand, crushed stone and other additives to produce a mortar that was used as a bedding between masonry elements. Lime mortar sets by the reaction with carbon dioxide from the air, a process known as carbonation.

Limestone sometimes included significant quantities of clay. When put through the kiln and slaked this produced hydraulic lime, a material that sets as a result of a reaction between lime and silicates in the clay. Hydraulic limes are available in a number of standard classifications (such as NHL2 and NHL3.5) based on the amount of clay in the original stone; the higher the number the greater the compressive strength.

Lime mortars have good water permeability and are relatively flexible under stress. This makes them ideal for situations where water ingress may be the driver of decay or where there may be slight movement in a structure. They can, however, be prone to failure in very exposed or very wet conditions.

Cement mortar

In 1824 Joseph Aspdin (a bricklayer and mason from Leeds) invented and patented 'Portland cement', named because of its resemblance to the famous building stone. Firing clay and chalk together at high temperature causes some vitrification of the silicates in the clay and the formation of a hard clinker that is the basis of all true Portland cements.

Although the basic composition and properties of ordinary Portland cement (OPC) were established by the middle of the 19th century it subsequently underwent many changes in formula. When war memorials were being constructed after the First World War, Portland cement mortars were widely used. However, the tradition of using lime mortars had not disappeared completely, so some memorials will have used lime putty or hydraulic lime mortars.

Cement mortars are very durable but their density, hardness and brittleness means they are prone to cracking which can let moisture into the structure. Their lack of permeability also means that they have had adverse effects on softer, more porous stones and bricks.

6.7 Other materials

Although this advice note does not cover windows, flags, rolls of honour and other commemorative artefacts, these may be intrinsic parts of a memorial. In such cases, specialist conservators should advise on the nature of the material and how best to deal with it. Lists of specialists can be found through the Conservation Register maintained by the Institute of Conservation (see Section 16 – Where to get advice).

7 Inscriptions and Types of Lettering

Soon after the First World War, a panel of experts including Sir Edwin Lutyens concluded that:

"Inscriptions may be carved in stone for many uses but the monumental inscription is usually designed to be a record for those who care to search for it rather than an announcement to the world – not so much an advertisement as a confidence."

Inscriptions are fundamental to the purpose and significance of a war memorial. They vary greatly in extent, from the startling simplicity of 'The Glorious Dead' carved into two sides of the Cenotaph in Whitehall to the list of names that are found on most war memorials.

Inscriptions can be found in a large range of styles and fonts and they can be executed in different ways depending on the nature and properties of the material. Some inscriptions may also be particularly important because they are the work of a significant artist, for example Eric Gill who carried out a number of commissions. These may have unique fonts, which add a further layer of complexity to any decisions on their retention, conservation or repair.

Given the age of most memorials, perfect preservation of their inscriptions is unlikely but legibility nevertheless remains a critical consideration when assessing the overall condition of a memorial and establishing the need for any intervention. However, legibility is a subjective matter and depends amongst other things on the levels and angle of illumination, the reflective qualities of the material, cleanliness and moisture content. It is also necessary to be realistic about the amount of improvement to legibility that can be achieved without causing damage to the historic character of a memorial.

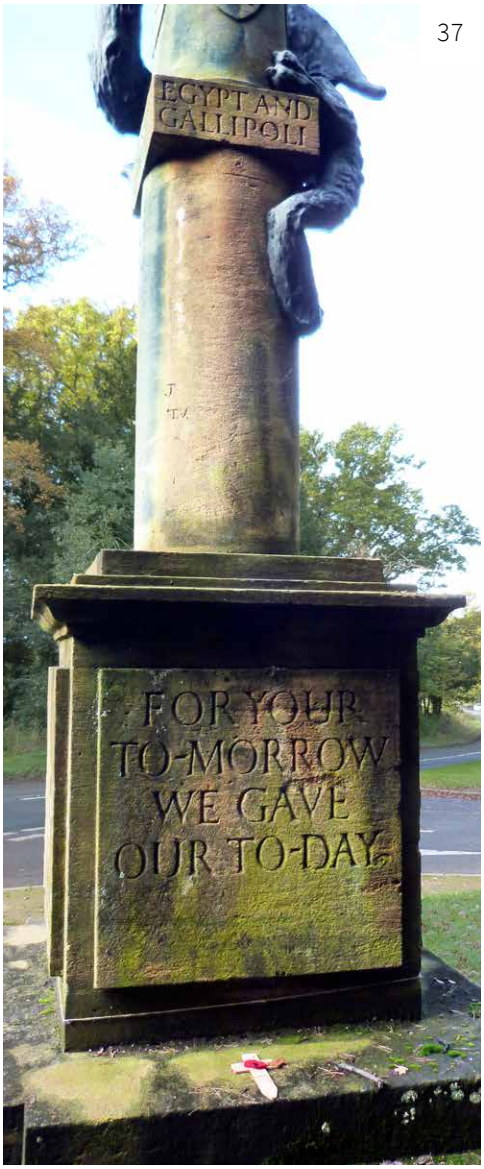
Some of the most commonly found types of inscription are:

7.1 Incised

This is the most common method of inscription in which V-shaped incisions are traditionally cut by hand. Fonts, styles and the depth of incision will vary depending on the type and hardness of stone. In softer stones, the edges are vulnerable to decay, which will reduce legibility. Lichens can also obscure the lettering particularly if it grows over the whole stone surface.

7.2 Incised and painted

This technique may have been originally intended or paint may have been subsequently applied as a means of increasing legibility. Paint types will vary and may have required some sort of primer or ground.



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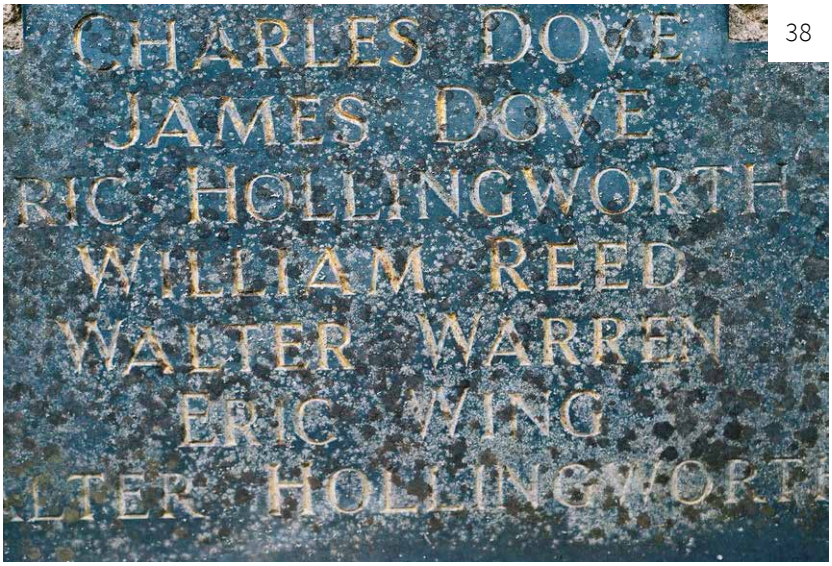

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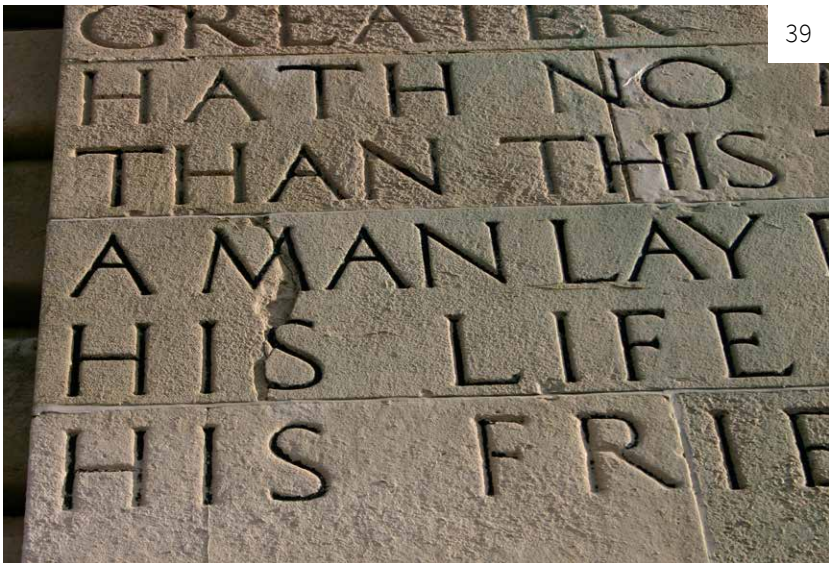

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Images 37–39

37. The bronze of St George and the Dragon at Stanway in Gloucestershire is by Alexander Fisher; the stone column and plinth was designed by Sir Philip Stott and the carving and lettering was carried out by Eric Gill. [photo © Odgers Conservation Consultants Ltd]
38. Incised and gilded lettering. [photo © Skillington Workshops]
39. Incised and painted lettering. [photo © Odgers Conservation Consultants Ltd]

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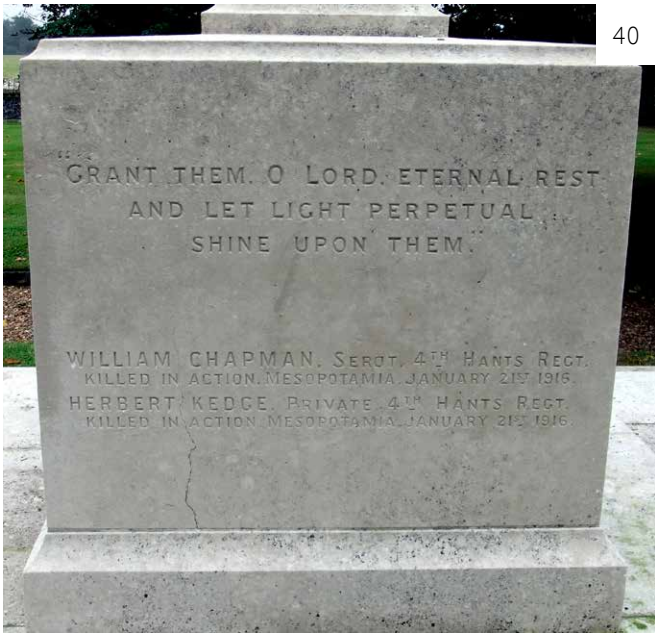
GRANT THEM. O LORD. ETERNAL REST
AND LET LIGHT PERPETUAL
SHINE UPON THEM.
WILLIAM CHAPMAN. SERGT. 4TH HANTS REGT.
KILLED IN ACTION. MESOPOTAMIA. JANUARY 21ST 1916.
HERBERT KEDGE. PRIVATE 4TH HANTS REGT.
KILLED IN ACTION MESOPOTAMIA. JANUARY 21ST 1916.

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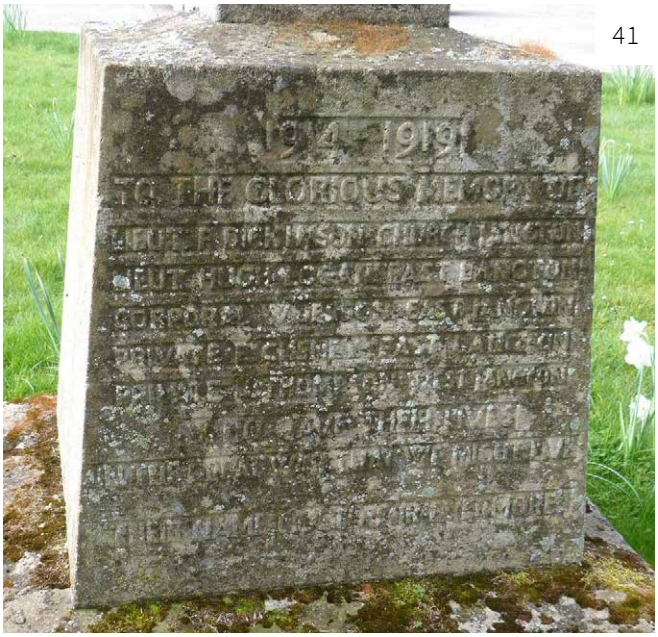

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TO THE GLORY OF GOD
AND
IN PROUD AND GRATEFUL MEMORY OF
THE MEN OF THIS PARISH WHO FELL IN
THE GREAT WAR 1914-1918.
TOM COLIN BARCHAM NORFOLK REG:
PERCY WILLIAM SWANN
GEORGE TURNER
DOUGLAS LAMBERT THE BUFFS.
ALBERT JOHN MACE LINCOLNSHIRE REG:
GEORGE WILD ROYAL SUSSEX REG:
ROBERT CHRISTMAS YAXLEY ROYAL FIELD ARTILLERY

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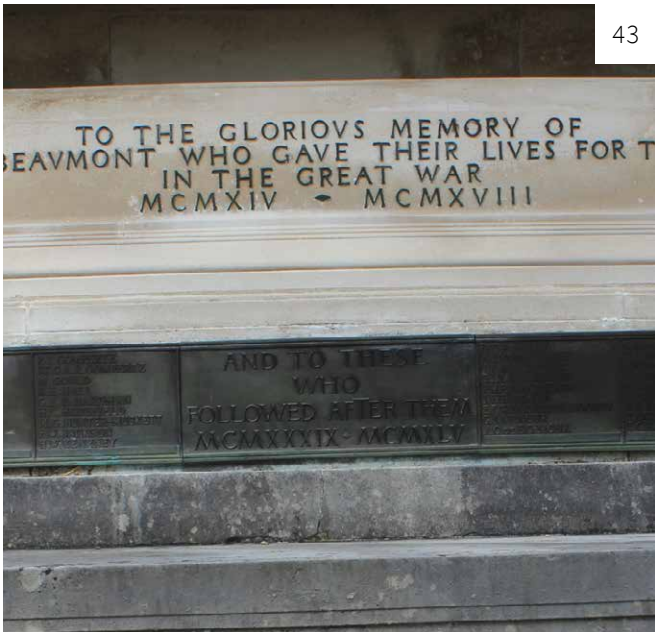

Images 40–43

40. Incised V-shaped lettering.
[photo © Elvetham Estate 2012]
41. Raised lettering.
[photo © East Langton Parish Council 2012]
42. Knapton war memorial in Norfolk, is constructed solely from granite. The front face of the plinth is recessed and smoothed to hold the lead inscription.
[photo © Knapton Parish Council 2010]
43. This memorial in Windsor has both individual bronze letters and a bronze inscription panel.
[photo © Julia Kelsall 2012]

Although the paint may help to preserve the stone, any flaking of the paint or deterioration at the edges will tend to reduce legibility. The choice of paints is important as inappropriate paints (such as household gloss) can be unsightly, block the pores of the stone and be very difficult to remove.

7.3 Incised and gilded

Gold leaf, when correctly applied to a well-prepared surface, is very effective at protecting underlying stone. It tends to be resilient to weathering but is susceptible to physical abrasion. Gilded lettering will be liable to decay alongside the stone round its edges; it will also deteriorate if the size (an organic material used to secure the gold leaf) decays, which may happen in exposed environments.

7.4 Raised

This technique involves cutting the stone back to leave the lettering proud of the surrounding surface. It is usually found in harder stones such as granite; for softer stones, the exposed edges of the lettering will tend to weaken and be liable to decay.

7.5 Lead

This is a common form of lettering on war memorials. The lead is usually tamped into incised letters and then cut flush with the surface. However, it can also be precast and applied to the surface of the stone. In both cases, the lead is held in place by being tapped into holes pre-drilled into the stone.

Although the lead will oxidise and darken, it remains stable; the lettering is liable to loss through loosening of the fixings, deteriorating stonework and theft. The run-off from lead is poisonous to algae and lichens so lead lettering tends to be free of microbiological growth. There are situations where other run-off (for example, lime) can obscure the lettering. Lead lettering is sometimes painted (often in black) or coated with patination oil to help improve legibility.

7.6 Bronze

Bronze lettering is usually raised and cast integrally with a backing plaque, although there are instances in which individual cast bronze letters have been applied to the surface of stone. Patination (either intentionally applied or as a result of the formation of green copper sulphate from pollution) and surface treatment affect the legibility of bronze lettering. The most likely causes of damage are active corrosion (pitting), lack of maintenance and inappropriate cleaning. It can be difficult to correct any errors or make additions to cast bronze lettering without these being obvious alterations.

7.7 Brass

Brass plaques are very common, whether on their own or as part of a larger memorial. Usually made of cast metal, they support incised or embossed lettering which may be highlighted in a different colour as part of the casting process or filled with other materials such as pigmented shellac. Brass plaques are generally resistant to corrosion but the bright-yellow brass oxidises to a dull yellow. When exposed to an external environment, a green patina of copper sulphate can detract from the legibility of the lettering.

8 Decay, Deterioration and Damage to War Memorials

All materials decay, especially when subject to prolonged exposure to the weather. The rate of deterioration of a memorial will vary according to the materials and method of construction, the degree of exposure and the prevailing environment. For any memorial, assessment of these factors and identification of the causes of decay are essential to appropriate repair and conservation. Incorrect diagnoses can lead to costly and ineffective interventions which may cause lasting damage.

8.1 Structural problems

Although structural problems may not be common in war memorials, there are various ways in which the structure can be compromised.

Inappropriate design or detailing can mean that water does not run off, leading to structural failures as well as staining and erosion of the surface. An example of this might be the pooling of water around timber elements of the memorial, which leads to rot. In memorials with stone or brick facings, water penetration may cause the disintegration of mortar or the corrosion of embedded iron straps, clamps and ties; this can lead to bulging, displacement, cracking or even loss of the facing.

Ground subsidence can cause a memorial or parts of it to lean, subside or, in extreme cases, to collapse. The movement may be due to insufficient foundations, erosion of soil at the base, disturbance from tree roots or excavation by burrowing animals. A common example is the disruption of steps leading up to a plinth; these may have been bedded on built-up soil or hardcore which has subsequently settled.

A side effect of any type of movement is that joints will open up, thus allowing plants and even trees to take root. Depending on the construction of the memorial, deformation of the structure can also cause loads to be concentrated in one spot; this can lead to spalling and fracturing of the stone.

Because war memorials are in public places, often on the roadside, there is an increased risk of impact damage from vehicle collision. If this is severe it can lead to significant structural problems; memorial gates and gate piers are particularly vulnerable. An increase in the volume and weight of traffic on an adjacent road can cause vibration and settlement that may affect the structure. Vandalism or theft of part of a memorial can also lead to structural problems.

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Images 44 and 45

This war memorial in Daventry is constructed on a raised plinth set into sloping ground. As a result of ground settlement or insufficient foundations, there has been some movement down the slope, which is shown by cracks appearing in the plinth.
[photos © Tom Keyes 2013]

In general, the warning signs of structural problems are significant leaning, disruption or cracking of the monument itself or physical upheaval of its surroundings. A leaning memorial need not always be a cause of concern but should be monitored for any future movement. The advice of a structural engineer with experience of historic structures (and having conservation accreditation) should always be sought in the first instance.

8.2 Properties of materials and the causes of their decay

Stone

Stone components of memorials are subject to a variety of decay mechanisms that can be generally categorised as chemical, physical and biological. The presence and behaviour of moisture is a common theme and plays a significant part in any deterioration. Because stone is a natural material it is bound to deteriorate to some extent over time but decay can also be due to previous attempts to repair or preserve the memorial.

Chemical

Some atmospheric gases, such as sulphur dioxide, nitrogen oxides and ozone can cause decay of stone surfaces. The effects are associated with the formation of gypsum (calcium sulphate), a mineral that is more water-soluble than the carbonate minerals from which it is formed. This is typically found as a black crust in protected areas of limestone memorials. Marbles (and some limestones) are particularly sensitive to chemical attack from acids formed from the combination of pollutant gases and water. This can lead to erosion of detail (especially lettering) and the loosening or 'sugaring' of grains.

Mineral changes near the surface of sandstone can cause a brittle and less permeable crust to be formed. This eventually exfoliates and is often referred to as 'contour scaling'. Deposits on sandstone, unlike those on limestone, are not soluble in water which means that staining is more usually seen in exposed areas.

Granites, although generally very durable, can deteriorate (particularly in damp polluted environments) through the breakdown of silicate minerals within the stone; this results in crumbling of the surface.

Rainfall can be slightly acidic as a result of both the dissolution of carbon dioxide and pollution. This can lead to the erosion of limestone and marble as well as encouraging mineralogical changes in other stones.

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Images 46–51

46. Porous stonework at low level will tend to remain wet. During spells of sudden or prolonged cold weather this moisture will freeze and expand and can cause significant damage to the stone.
[photo © Elmore Parish Council 2011]
47. Sandstone has a tendency to darken on prolonged exposure to moisture. This principally occurs due to mineral migration.
[photo © Odgers Conservation Consultants Ltd]
48. Black crusts (also known as gypsum or sulphate crusts) are common on limestone memorials. They are found in sheltered unwashed areas of the memorial and are formed by the reaction of limestone with sulphur dioxide from pollution.
[photo © Skillington Workshops]
49. Stonework is susceptible to decay through salt crystallisation. The source of this contamination can be from road salt, groundwater, materials used in construction and, as in this case, the sea. Salt-laden mist has caused deterioration of the detail, particularly on the sea-facing side.
[photo © Sheringham Parish Council 2009]
50. Cracked or missing pointing, particularly at ground level, allows vegetation to become established. Although many lower plants are not damaging, they can contribute to damage from freezing and allow water ingress. If allowed to grow, the roots of higher plants can cause disruption to the masonry.
[photo © Mr C E Moreton 2011]
51. Marble decays mainly through sugaring of the surface. This tends to occur on carved areas due to a combination of dissolution and the effects of heating/cooling cycles.
[photo © Odgers Conservation Consultants Ltd]

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Images 52 and 53

52. Algae will grow in any situation where there is a suitable combination of moisture, nutrients and environment. In the case of the Royal Artillery memorial at Hyde Park Corner, adjacent trees provide nutrients, while the poorly draining horizontal surfaces of the high level stonework are perpetually damp.
[photo © Odgers Conservation Consultants Ltd]

53. Stone is a hard but brittle material and is therefore susceptible to damage and vandalism as shown by this broken inscription panel.
© Taylor Pearce Ltd

Physical

Degeneration of natural rock formation

Sedimentary rocks, such as limestone and sandstone, are formed by deposition of particles, which build up in layers termed 'beds'. In any construction, stone should be placed so that its natural bedding plane is perpendicular to applied forces or weathering. If this is not the case, weathering takes advantage of the natural weaknesses between the beds and can lead to delamination of the stone. Inscription panels, particularly because of the height required, may be 'edge bedded' with their bedding planes parallel with the face. This makes them susceptible to delamination leading to loss of inscriptions and surface details.

Beds within sedimentary rocks can also contain varying amounts of clay. As clay expands when wet and contracts as it dries, repeated wetting/drying cycles can cause clay-rich beds to decay preferentially. This can be manifested either through different degrees of erosion or (for sandstones particularly) delamination of the surface. Slate is extremely durable and may remain sound even in the most inhospitable situations, but it is still susceptible to delamination.

Disruption through soluble salts

Salts can be present as a result of:

- ground water which contains dissolved salts derived mostly from the natural degradation of plant materials
- Rainfall run-off or splash–back contaminated with salts especially from roads and pavements that have been treated with de-icing grit
- materials used in the construction or repair of a memorial, especially cement
- sea salt either from contaminated sand used in the construction or, for memorials close to the sea, blown by the wind.

The stone of a memorial is normally buried in or has contact with the ground and, because stone is generally porous, it will act as a wick

for both the ground water and any run-off or splashing of contaminated rainwater. As this evaporates salts will appear as crystals, often white in colour. This is generally referred to as efflorescence and should not cause major damage; it can be brushed off with a natural bristle brush. When salts crystallise within the sub-surface pore structure of the stone (known as cryptoflorescence), internal stresses are created which lead to the weakening and loss of stone. Repeated wetting and drying cycles exacerbate this process by causing salts to go into and out of solution.

Freeze/thaw activity

The way that water runs off may not have been a principal consideration when the memorial was designed. However, if there are flat areas (for example paving or steps) or open joints and surface voids where water is trapped, the surface may remain saturated. If water within the pores of the stone is subject to freezing, it can create a bursting pressure that causes decay. A freeze/thaw cycle can be repeated many times each winter, leading to crumbling of the surface and the gradual disappearance of details such as inscriptions. Frost damage on stone memorials can be extensive and destructive, particularly if the damaged stone is not repaired before the next winter.

Biological

Trees

Well-maintained war memorials tend not to be liable to damage from this source. However, trees may be an intentional or unintentional part of the surroundings of a memorial and so they can become invasive. For example, memorials too close to trees can suffer damage from roots or staining from deposits such as sap.

Shrubs and climbing plants

These can engulf a memorial, prevent the evaporation of moisture and attach themselves to vulnerable surfaces. Woody species, such as Buddleia cause physical damage by establishing root systems within joints which then push elements of monuments apart. Creeping plants, such as ivy or Virginia creeper are tenacious and can cause physical damage as well as trapping moisture and encouraging staining on the surfaces. There are many non-woody herbaceous plants that cause no problems, but any plant that causes disruption to pointing between stone elements can cause moisture to get into the memorial with potential adverse consequences.

Lower plants

The discolouration and patina caused by microbiological growths (such as bacteria, moulds, algae and lichens) often add to the mellow and historic appearance of war memorials. Although this may be generally desirable, excessive colonisation can obscure inscriptions. Some growths secrete acidic deposits or hold moisture, which in the long term may lead to slight deterioration of the stone surface.

Previous interventions

Despite the best of intentions, some previous repairs of stone memorials may have led to further deterioration. This is why it is so important that the correct methods and materials are used. The most common ways in which previous repairs can cause problems are:

Cleaning

Stone is vulnerable to inappropriate cleaning processes that lead to the pores of the surface being exposed; this allows pollutants to collect and microbiological growths to become established. The cleaning process might have been too aggressive (for example sand blasting), inappropriate for the type of stone (for example chemical cleaning of limestone with acidic-based cleaners) or too frequent (for example regular maintenance using a pressure washer).

Pointing

It is likely that most stone war memorials will have been repointed at some stage. This is primarily to prevent moisture ingress and plant growth but it also improves the appearance. Cement mortars were often used in the past, but these tend to be hard and impervious. They will tend to crack and encourage moisture movement through the adjacent stone rather than through the pointing; this can lead to accelerated decay of the stone.

Surface treatment

Products that claim to protect and preserve stone have been around for a long time. Many of these were based on silicones, more recently replaced by siloxanes. All of them will claim 'moisture permeability' but this usually means that they are permeable to water vapour and not liquid water. If used in the past they will have changed the moisture transfer characteristics of the stone, which can lead to lamination of the surface.

Metals

Bronze

Bronze is extremely resilient and corrosion is usually superficial. External bronze will slowly develop a protective patina. This may be marred by differential streaking or deposits of black caused by the combination of rainwater run-off, condensation and pollution; these will tend to lead to corrosion. 'Active' corrosion, which is typified by bright green pitting, pustules and powdering, is not protective and is damaging. Chloride contamination can cause pitting, especially in areas that are not washed by rain.

The run-off from bronze causes deep-seated green staining to porous stone surfaces beneath. Bronze statuary may well include iron armatures which, if water gets through a flaw in the bronze, are liable to corrosion which can in turn cause disruption.

Previous treatment of bronze may cause ongoing problems. In the past, aggressive methods of cleaning (including abrasive blasting) have caused pitting of the surface. A more complex issue is the repatination or protection of the surface. A number of different methods have been used for the latter, including epoxy and vinyl-based formulations and paint. These inappropriate coatings can be difficult to remove and as they deteriorate they allow water, air and pollution to attack the surface. The most common current method of protection is to use microcrystalline waxes or lanolin formulations; these are often tinted and give rise to a homogenous dark surface patina.

Brass

The most common causes of deterioration to brass are corrosion (usually caused by condensation or other sources of moisture)

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Images 54 and 55

54. Stonework beneath bronze elements such as plaques is liable to green copper staining from the water run-off. This staining can penetrate deeply into porous stonework making complete removal very difficult.
[photo © Odgers Conservation Consultants Ltd]

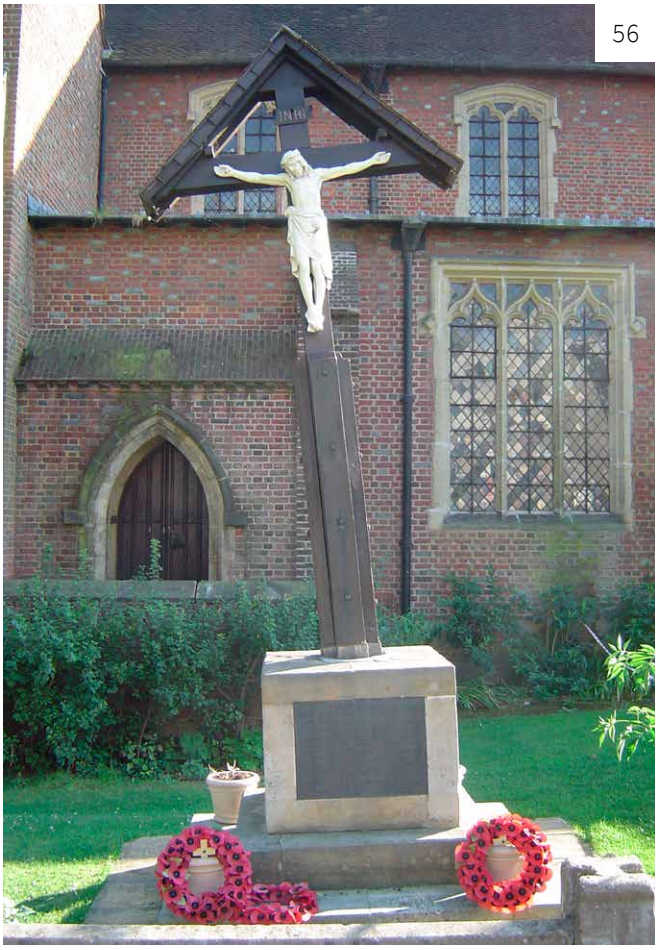
55. This differential staining is typical of exposed bronze statuary. Most of the surface has developed a natural patination but the original bronze colour is visible in protected areas. There is also staining from bird droppings and water run-off.
[photo © Odgers Conservation Consultants Ltd]

and over-zealous cleaning. Brass is associated with a highly polished surface but it is liable to tarnishing from being touched – grease, moisture and salts are all present on fingers. The temptation is for this patchy finish to be removed by further polishing. However, this is an abrasive process and is not sustainable in the long term.

Iron

Iron was commonly used for railings around war memorials, as a cramp between sections of stone or as a means of securing inscription panels to a backing. The corrosion of wrought-iron cramps causes expansion of the metal and this can lead to fracturing and disruption of the adjacent stone or other brittle elements.

If regularly maintained, iron is extremely robust. Lack of routine maintenance or repainting will, however, expose the metal to moisture, which causes corrosion in the form of rust. This is observed initially on the surface of the metal,



Images 56–58

56 & 57. The base of the timber of this depiction of Calvary had rotted as a result of moisture getting into the rebate in the stone plinth. Attempted repairs with lead and mastic failed to solve the problem because the rot was already too well established.
[photo 56 © Alan R D Clark, 2009]
[photo 57 © St Barnabas, Woodford Green PCC 2009]

58: Decay of the sole plate of this lych-gate is very advanced and all structural integrity with the vertical timber has been lost. The cause of decay is water- no attempt has been made to divert rainwater away from the timber which is in direct contact with the paving.
[photo © St Mary's Lychgate Restoration Group 2008]

usually at the base of railings or within crevices where water becomes trapped. After prolonged exposure, the corrosion can lead to disintegration.

Lead

Lead statuary is prone to splitting due to the corrosion of the internal iron framework. Lead is also susceptible to deformation or 'creep', whereby it slumps under its own weight. Lead lettering can become detached due to the lack of adequate fixing. It has also been known to be attractive to some birds and squirrels; removal and pecking marks are not uncommon.

Timber

Physical

Timber is susceptible to light, wind, moisture movement, and freeze/thaw. The combination of all these can cause a change in appearance (for example bleaching of dark woods), small surface cracks and erosion, although the rate of this is very slow.

Biological

Because it is a natural product, most deterioration of timber is due to biological changes in its structure. The most important and widespread of these result from the interaction of moisture with

Image 59

This war memorial at Barley, Hertfordshire takes the form of a white marble wheel cross set on a three-stepped base surrounded by concrete paving with steps leading up to it. The brickwork that supports the steps has decayed badly due to poor drainage from the paving above. The paving has now been replaced with gravel.
[photo © Barley Parish Council 2009]

the timber. In general, but not exclusively, damp timber is liable to attack by fungi and insects. It is particularly susceptible to situations where moisture cannot evaporate and the permanent dampness leads to rot; a good example of this is the base of timber crosses set into stonework. There are many species of fungi that are capable of damaging softwood and hardwood; these break down the structure of timber and rely on moisture to germinate.

Previous interventions

Over-cleaning or the use of household cleaners can be damaging as they can deposit salts or make the surface more resistant to cleaning with the result that more invasive methods are required.

Varnish on timber can break down and lead to crazing. This can allow water to penetrate as well as being unsightly. Also, use of inappropriate wax or oil can make the timber sticky and more prone to trapping dust and dirt. Inappropriate varnishes or paints can cause problems with moisture transfer and also have an impact on the aesthetics of the memorial.

If the original timber has been repaired with a different type of wood, differential expansion and contraction of the old and new materials can cause cracking.

Brick

Like stone, brick is susceptible to deterioration through a number of factors, many of which are moisture related.

Chemical

Moisture

Traditional bricks tended to be very permeable but their modern counterparts are much less so. Problems arise when the brickwork is exposed to large quantities of liquid water, for example through faulty drains and flashings, defective roof coverings or rainwater goods. This can cause expansion and contraction of clays within the brick leading to spalling, particularly if the brick has been poorly fired. The process of moisture transfer is often complicated by the interfaces between the bricks and mortar.

Pollution

Like other porous building materials, bricks are subject to the deposition of particulates from pollution. These pollutants tend not to react with the brick but they can collect within the pores and on the surface, especially in those areas not regularly washed by rainwater. The appearance of blackened brickwork is common in industrial areas. Although not damaging in itself, this has often led to the use of aggressive cleaning techniques which have only encouraged subsequent deterioration.

Physical

Mechanical damage

Most bricks are quite soft and therefore susceptible to impact damage from vehicle and pedestrian traffic or other building use. Damage to the brick skin can allow the ingress of moisture into the heart of the brick and lead to further deterioration.

Defects in manufacture

Although industrialised production means that the quality of bricks is now better controlled, impurities in the clay and under-firing can lead to decay due to moisture penetration and thermal changes.

Salts

Cycles of salt crystallisation are a major cause of damage to brick masonry. The salts (often sulphates) may originate from the clay from which the bricks were made, pollution, the original mortar or from materials added later (especially Portland cement). They may also be carried into the brickwork from blocked drains or overflowing rainwater goods, or from water splashing on to walls from salt-treated pavements and roads in winter. Other salts (often nitrates) can also originate from ground water. Rainwater washing down over limestone string courses or cornices can collect carbonates and sulphates which are then transferred onto or into the brick at lower level. Salts usually appear as a band or patches of white efflorescence.

Erosion

Bricks are susceptible to wind and water erosion, particularly in exposed situations or where the original surface or fireskin of the brick has been damaged, for example by inappropriate cleaning.

Freeze/thaw

Frost will only damage very wet brickwork, so areas that commonly fail are those close to the ground, horizontal surfaces or those which suffer from unusual exposure, such as free-standing and retaining walls around the perimeter of war memorials. Because brick is very porous, the use of an inappropriate hard mortar will encourage water to pass through the brick rather than the mortared joints, allowing it to become saturated and prone to freezing. Depending on the type of brick, frost damage may cause surface granulation, flaking or (in the case of glazed bricks) spalling of the glaze.

Biological

The problems for brickwork caused by tree and plant growth are the same as those for stone. Bricks are, however, less prone to the growth of algae and lichen.

Previous interventions

There are a number of ways in which brickwork can be adversely affected by previous interventions.

Cleaning

Abrasive methods of cleaning can damage the brick surface, particularly if it has a fireskin. This allows moisture penetration and can encourage salt formation as well as providing a rough surface on which pollutants can collect.

Pointing

Although modern bricks tend to be hard and durable enough for Portland cement mortars to be used without problems, they can introduce damaging salts. For softer bricks, construction or repointing with cement mortars can cause moisture to be retained within the brick and lead to deterioration.

Surface coatings

It is rare for brickwork on war memorials to have surface applications (such as paints, preservatives and protective coatings), but when present they will change the way in which moisture enters and evaporates from the brick, leading to a build-up of moisture and related damage.

Concrete

Until the 1970s, concrete was promoted as a maintenance-free material. It was assumed that detailing to shed water from the structure was no longer important and that reinforcing bars embedded inside concrete would not corrode. The reality, however, is that concrete is susceptible to a number of different forms of decay.

Chemical

Salts

The main cause of salt deterioration of concrete is chlorides from the sea in coastal areas or from winter

road salting. Apart from surface deterioration, the presence of excess chloride in the pores of concrete causes breakdown of the protective layer on the internal steel reinforcement and leads to corrosion and subsequent spalling of the cover. Sulphates can also form from the reaction of pollution (sulphur dioxide) with calcium hydroxide in the cement; this can cause cracking and spalling of the surface.

Coatings

Coatings may have been applied to exposed concrete to try to control its moisture content and corrosion levels. In most cases these tend to encourage the retention of moisture within the concrete leading to enhanced corrosion of reinforcement.

Physical

Mixing and placing

The materials used to make concrete and the way it is mixed and placed can have a significant effect on its durability. Problems arise from poor selection of aggregate (for example not well-graded), contamination of aggregates (for example chlorides), the mix being too wet, poor compaction and uncontrolled hydration of the cement (for example drying too quickly).

Reinforced concrete

Deterioration of reinforced concrete principally occurs as a result of corrosion of the embedded steel reinforcement. Corrosion is usually prevented by the alkaline nature of concrete that protects the steel. Carbonation (the reaction of carbon dioxide with the alkaline hydroxides in the concrete) is a slow and continuous process. If it penetrates to the depth of the steel, it will cause it to lose its protective layer and become susceptible to corrosion in the presence of water and air. In concrete that has been well mixed and laid and where the reinforcement is sufficiently deep, this process can take hundreds of years. However, if the reinforcement is shallow and the concrete is poor quality, corrosion of the reinforcement can become destructive within a short period of time; this is usually shown through surface cracks and iron staining.

Mass concrete

Non-reinforced concrete is subject to the same external influences as reinforced concrete but processes such as carbonation are benign. It is, however, susceptible to cracking and movement. If cracks appear, rainwater can flow through these and cause white calcareous deposits to appear where the water exits.

Image 60

There are not many memorials constructed from concrete. Although a strong robust material, it is liable to cracking from corrosion of any embedded steel reinforcement as shown in this example at Cranford. [photo © London Borough of Hounslow 2008]

Structural cracking

Concrete is strong in compression but brittle. The extent, direction and nature of any cracking will depend on ground conditions, the construction and maturing of the concrete and the development of any deterioration. These sorts of structural issue are likely to be restricted to large memorials where concrete has been used as the core material. Expert assessment will always be required in such instances.

Non-structural cracking

This is a characteristic of reinforced concrete and in most cases has little effect on strength or durability. Often it arises during the construction process, for example as a result of uncontrolled drying, premature removal of shuttering. A common example might be the cracking of a concrete apron around a memorial where the lack of expansion joints will lead to development of surface cracks that will allow vegetation to become established.

9 Assessing and Recording Condition of War Memorials

9.1 Condition survey

A basic condition survey involves observation of the condition of a memorial and is a simple way of checking the condition of all its key components; it comprises a written account and supporting photographs.

A survey may be undertaken for a number of reasons such as to check whether any repairs are needed, to monitor any concerns or to identify whether more professional assessment is required.

The template in this guidance (see Condition Survey) includes the key features that should be included in a condition survey and used for regular inspections. Concern about the condition of a memorial can be reported via War Memorials Online (www.warmemorialsonline.org.uk) or by completing War Memorials Trust's 'condition survey' (www.warmemorials.org/conditionsurvey). All these forms ask for very similar information so depending on the reason for undertaking a survey, only one of them needs to be completed. It is also advisable to send copies of the records to the custodian/owner, local archives and the relevant Historic Environment Record, which in most areas is held by the county council or unitary authority.

The overall condition should be identified based on the following guidance:

Good: (Image 61) A memorial in good condition is well maintained, stable and secure. Inscriptions and names are legible.

Fair: (Image 63) A memorial in fair condition is reasonably well maintained, generally stable and secure but in need of some maintenance and minor works. Inscriptions and names are generally legible but should be monitored as some deterioration is noticeable.

Poor: (Image 62) A memorial in poor condition has significant damage or deterioration that requires work in the near future (within two years). Inscriptions are obscured or fading.

Very bad: (Image 64) A memorial in very bad condition is unstable, hazardous and is clearly not maintained. Urgent action is required to rectify serious problems. Inscriptions and names are barely or no longer legible.

Recording a memorial provides a snapshot of the condition at the time of the inspection. A more complete picture can be achieved by repeating the process regularly (preferably annually) using the same condition survey template. Changes between successive surveys reveal progressive decay and identify whether factors that might appear to be current and requiring urgent attention are in fact long-term issues that do not pose immediate problems.

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Images 61–65

61. The Horwich Locomotive Workers' war memorial in Lancashire is composed of a granite plinth bearing an incised inscription and the names of the fallen. This is surmounted by a marble statue of a soldier in mourning pose with his rifle by his side. The memorial is located within a conservation area. Its good condition is as a result of regular maintenance but also appropriate and timely repairs. These include repairing the minor pitting to the stone, re-cutting the lettering by hand, and re-painting the lettering with black enamel. As a result, the inscriptions are once again legible while preserving the historic fabric and integrity of the memorial as a whole.
[photo © Horwich Town Council]

62. Mytholmroyd war memorial in West Yorkshire was sculpted by H.S. Davies and it was dedicated in 1922. It has had a chequered history in that the original head of the soldier was removed in 2000 and was replaced by a stylised version to show that it was not the original. In addition, a stolen rifle had been restored in fibreglass. The memorial has now been fully restored.
[photo © Calderdale Council 2009]

63. The war memorial in Devizes has a classical-style curved wall with central arch; it is constructed in Doulting stone with bronze inscription plaques. The memorial has recently been listed and is located within a conservation area. Bronze Second World War plaques were recently added using non-ferrous anti-theft fixings, the names of those to be recorded having first been extensively researched by the Royal British Legion. As a result of its newly awakened interest in the memorial, the community intends to support a regular maintenance programme to ensure its long-term protection.
[photo © Devizes Town Council 2010]

64 & 65. This war memorial cross stands in the grounds of St Chad's Church at Kirkby in Merseyside. In 1991 it was severely damaged and in very bad condition; the cross was destroyed and the pieces held in storage while the plinth remained in the churchyard. The local community subsequently decided to restore the memorial with the encouragement of the Knowsley branch of the King's Regiment Association.
[photos © King's Regiment Association Knowsley 2005]

9.2 Photography

The written record will make much more sense when supported by photographs; this is particularly important for specific decorative elements, inscriptions and areas of concern that might not easily be described in words. Digital photography has made the recording and archiving of images much easier. General photographs of the memorial in its wider setting should always be taken, as this will highlight any environmental factors that may be affecting the condition of the memorial. In addition, there should be photographs of important or decorative elements (such as inscriptions) as well as any areas of concern.

Stone can be difficult to photograph because of its homogeneity; in particular incised lettering can be hard to record especially if there is surface lichen. In such cases, raking light or lightly spraying the surface with water can help with legibility.

A regular photographic record provides invaluable information on rates and patterns of deterioration and should be an integral part of the ongoing maintenance of a war memorial. A set of digital images should ideally be kept by the custodian and the local community, but War Memorials Online also provides a central depository for images of the condition of war memorials. Photographs should always include captions and the date on which they were taken.

Although digital photography is the most common and easiest way of recording memorials, scaled drawings and plans are other options. Because they are based on accurate measurement they are invaluable for recording repair and conservation projects.

9.3 Structural monitoring

Structural issues can never be assessed in a single visit. A programme of monitoring is always necessary in order to establish whether the problem is ongoing or historic. In the first instance the degree and direction of any lean and the length, width and depth of any crack should be measured and good photos taken. The evidence can be recorded with technical equipment or simpler methods such as the placing of a coin beside a crack to serve as a baseline for future comparison. The condition of the surrounding ground can also be informative; water may have washed away the soil around the base of memorials or, especially in churchyards, there may be some unevenness from collapsed graves.

If repeated measurements or photographic comparisons show no change, then the problem is likely to be historic, or at least dormant. Simple observation can also be useful; for example if a crack contains accumulated dirt, this tends to indicate it is not recent. If there is any increase in measurements or other development that gives cause for concern, a structural engineer should be asked to look at the memorial.

9.4 Surroundings

This can include both the immediate curtilage of the war memorial and the wider surroundings. A ground plan is often a useful aid to understanding exactly which area is included as part of the memorial. It is important to look at and record local environmental factors such as the proximity of drains, adjacent roads and buildings.

The condition of surrounding vegetation and trees is important for the way in which it may affect the materials of the memorial itself. For example, overhanging trees will cause the memorial to remain damp and make it susceptible to the growth of algae. Vegetation also affects the way the memorial is viewed. Where possible the species should be identified as this will help to establish whether they are likely to be benign or to pose an ongoing problem.

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Images 66 and 67

66. If settlement or disruption to a memorial is suspected, simple monitoring with a spirit level can show if there is an issue that needs the advice of a structural engineer.
[photo © Tom Keyes 2013]

67. The steps around a memorial often provide the first hint of structural problems. In this case, there is slight disruption of the lowest step, which is probably due to exposure and erosion of mortar from the brick foundation.
[photo © Odgers Conservation Consultants Ltd]

Many war memorials are enclosed by walls or railings; any damage or deterioration to these will have implications for the condition and overall appearance of the memorial as well as affect issues such as access. Disruption to the paved surrounds of memorials can cause a trip hazard as well as providing early signs of ground movement. Any assessment should also address the susceptibility of the memorial to anti-social behaviour, including factors such as lighting and the presence of secluded areas within the curtilage of the memorial.

Work to the landscape around a war memorial falls outside the scope of this guidance note but information on the appropriate considerations and methodology can be found in *Conservation and Management of War Memorial Landscapes*, published by War Memorials Trust.

9.5 Expert advice and analysis

The detail and extent of any assessment should be relative to the size and complexity of the war memorial; a simple cross might require only limited inspection but a larger memorial with multiple problems might need the input of various professionals. Structural concerns will nearly always need assessment by a structural engineer. Although detailed assessment may be constrained by factors of cost or physical access, a professional and thorough condition survey will ensure that all issues are addressed. It can be used as a basis for preparing a schedule of works and will also be helpful in supporting grant applications.

Professional advice would normally be required for:

- establishing the causes of decay
- recording environmental data to understand the corrosion of internal memorials
- undertaking structural investigation
- mapping decay patterns
- investigating the interaction between different materials used in the memorial

Contact details for suitable professionals are available from the respective professional bodies, details of which can be found in Section 16 – Where to get advice.

9.6 Statements of significance

It is recommended that a statement outlining the significance of a memorial is produced, especially if a conservation or repair project is proposed; this will help identify those aspects which require particular consideration and retention. The significance of a memorial is embodied not only in its physical material and setting but also in the meanings it has for people through use, association and commemoration. Understanding the significance of a place is fundamental to determining the best approach to its care and repair. Only if the heritage values are understood will it be possible to assess whether proposed works will have a beneficial or harmful effect on the memorial.

A basic statement of significance should include:

- confirmation of whether the memorial is listed/scheduled or in a conservation area; this will have a practical influence on what works can be undertaken
- the names of any noted craftsmen, sculptors or architects who were involved in the creation of the memorial as this will also influence what works can be undertaken
- key elements of the memorial's design which it is important to retain (such as inscriptions and decorative elements)
- explanation of what is important about the asset, why it matters and to whom.

This approach is more fully described in *Conservation Principles, Policies and Guidance* published by Historic England (Section 17 – References and further reading)

10 Practical Conservation Treatment – Introduction

Once the need for and extent of treatment to a memorial has been established, the process of commissioning the work can begin. This will involve taking appropriate advice, drawing up a method statement, obtaining the relevant consent for any works from the statutory authorities, making sure funding is available (see Section 15 – Funding for War Memorials) and then procuring the work. Before any work starts, it is essential to check that the owner has given permission and that any necessary access and highway licences have been obtained.

One of the biggest challenges is to ensure that the people tasked with carrying out any intervention have sufficient skills and experience to deliver work of the highest quality. They must have knowledge of the materials and be able to use the necessary techniques (for example hand-cut lettering or non-abrasive cleaning) to ensure that the values of the memorial are not compromised or its fabric damaged.

10.1 Preparing a method statement

It is best practice to draw up a method statement (also known as a project proposal) that includes a description of the monument, a description of the deterioration and a summary of the work to be carried out, with details of the methods and materials to be used. A basic version of a method statement can be prepared based on observations made during the condition survey. This statement can also be used to highlight any further investigation that requires professional input.

For smaller projects, this document does not need to be long but it must detail the type and extent of the work proposed (such as repointing with lime mortar or cleaning). The contractors invited to provide a quotation should also be asked to provide more detailed information with their submission. The method statement brings together the information collated in Sections 6–9 of this guidance; it will be an essential part of the process for obtaining any consent or for applying for any grants.

For more complex memorials or specialist work, a detailed version of a method statement

will usually have to be drawn up by an architect, surveyor, conservator, mason or other experienced conservation professional. This document is called a 'schedule of works' (part of a 'specification') and will itemise the works required along with the materials and techniques to be used. This is helpful for obtaining competitive and comparable tenders.

The main requirements for preparing a method statement are:

- ensuring that the materials of the memorial are identified and that the design and construction of the memorial is understood along with its surroundings
- using the condition survey form and the information in Section 9 to understand how the materials have decayed, any interaction between them, surface appearance and the legibility of the inscription
- establishing that the aims of any proposed conservation take into account the conservation principles described in the box opposite
- preparing a summary of the works or, if more detail is required, a schedule of works.

Further guidance on *Preparing a Method Statement* is available from War Memorials Trust.

Principles of practical conservation

Conservation of a memorial should never be thought of solely in terms of practical treatment. It is intrinsically linked with the values that we associate with it; establishing these values will affect the degree of intervention that is considered appropriate. Since the mid-19th century a number of manifestos and charters have sought to set down the underlying principles that should govern the work to historic buildings and monuments. These are described in detail in *Practical Building Conservation: Conservation Basics* (2012).

A number of phrases such as 'reversibility' and 'minimum intervention' are often used to summarise these principles. However, these do not do justice to the complex series of questions that need to be asked when considering the need for intervention on war memorials.

When considering options for practical repair, there are a number of overriding criteria that should be taken into account.

- Only materials which have been demonstrated to be appropriate to the original fabric should be considered. These will normally be the same or similar to the host material. Where this is no longer possible (for example original stone is not available), the technical and aesthetic properties must be compatible with the original.
- Any method should aim to be the least interventive to achieve the desired aims; this might mean using a gentle water-based cleaning system rather than an abrasive method.
- Interventions should aim to maximise the life expectancy of the memorial while retaining as much of the original fabric as possible. For a memorial, this might mean deciding to retain features if they can be repaired or if they are still performing their function.
- Interventions should aim for reversibility (that is they can be removed without having affected the original fabric) although in many cases this may be neither feasible nor practicable.
- Interventions should not preclude repeated or other interventions in the future. This concept of 'retreatability' encourages the use of like-for-like repairs, sacrificial repairs and coatings.
- All works should be adequately recorded and the records made available to others.

11 Practical Conservation Treatment – Repair

11.1 Emergency measures

If a memorial, or any part of it, has been identified by a relevant professional (usually a structural engineer) as being unstable or unsafe, the first priority is to cordon it off and put up easily visible signs. In certain cases, specifically designed temporary supports may need to be installed. These would be constructed from props or scaffolding and must always be designed and erected in accordance with guidance from a structural engineer. Although this sort of intervention is rare, there are occasions where collision or theft has left a war memorial in a state that means access to it must be prevented.

Barriers provide only a short-term solution and require daily inspection to ensure that they have not been breached. It is unacceptable to use barriers around a historic monument for a prolonged period of time; they are not a substitute for considered conservation action. Similarly, while temporary or localised dismantling may be a reasonable response to urgent safety concerns, this is not an acceptable permanent solution for any memorial.

Any decisions regarding dismantling should only be a last resort, and they must be made by conservation professionals who should supervise the work. If it is not undertaken appropriately, any dismantling could cause more damage. It should also be recognised that if a memorial is dismantled or inaccessible it is not able to perform its commemorative function and this is likely to cause local distress.

11.2 Structural repair

Details of substantive structural repairs should be drawn up by a structural engineer or possibly an experienced conservator. Practical interventions will normally require specialist contractors and equipment. In extreme cases, where overall stability of the memorial has been compromised, appropriate dismantling and rebuilding is likely to be required although propping and stabilisation may be necessary in the short term.

In stonework, the type of repair will depend on the severity of the cracking and the location and function of the stone. If the cracking is restricted to the joints, then it may be simply a matter of grouting and repointing with appropriate mortar. If the cracks run through stones and there is disruption either side of the crack, then some localised dismantling and rebuilding may be required incorporating (if original stones cannot be repaired) new stones to replace the cracked ones. This provides some bridging across the crack; alternatively, additional support can be given through the introduction of a helical stainless steel bar. This should be set into the joint perpendicular to the fracture.

Pinning with dowels can be used to give structural support and cohesion to individual stone elements; this work can usually be specified by a skilled contractor or conservator. In the event of any subsequent movement, pinning may cause cracking elsewhere, either within the same stone or in adjacent stones. Surfaces to be bonded together should always be carefully cleaned and pieces fitted together dry to identify contact areas. For larger pieces of stone, a thixotropic, moisture-insensitive two-part epoxy resin is applied, keeping the adhesive slightly back from the edge. Most of these adhesives require a minimum air and surface temperature of 10°C to cure. Smaller sections of stone (typically less than 50mm in all three dimensions) can be joined by using less brittle adhesives, such as finely ground lime mortar or lime and casein glue. Minor gaps can be filled with appropriate mortar.

In many cases, repair of fractured stone will require the use of pins as reinforcement. The number, depth and type of pins will depend on the cross-section of stone, the nature and soundness of the material, and the location and shape of the fracture. Where pinning is required, holes should be drilled (perpendicular to the break) at slow speed, using a non-percussive variable-speed drill with tungsten-carbide or diamond-tipped bits.

Threaded stainless steel rods are recommended for pinning and these should be set in a moisture-insensitive adhesive. Grade 316 austenitic stainless steel is the standard material as it is especially resistant to corrosion. Alternative pinning materials such as fibreglass and carbon fibre can be used because they are inert; however the surface will need to be hatched to provide a rough key. If iron cramps have corroded and need to be replaced, they should be carefully removed using a drill or chisel and then replaced with stainless steel.

Relocation of memorials

War memorials were usually located in places chosen by the community. They should therefore be preserved in their original position unless there is a very good reason not to do so. Some locations were chosen because they had particular importance, such as where soldiers signed up. Others commemorate connections other than to regiment or service, for example memorials in schools, clubs or workplaces.

Relocation should only be considered if the current position is putting the memorial at risk or it has become inaccessible to the public. War Memorials Trust has a helpsheet, Relocation of War Memorials that provides further guidance. In almost all cases, there are alternatives to relocation, such as altering access arrangements, managing traffic or reconsidering development proposals. In extreme cases in which movement is the only option, the new location should ideally have a geographical or social link with the original community. If a memorial, such as a plaque, is attached to a building that is to be redeveloped it should if possible be retained on site. Where the relocation is driven by development, the cost should normally be borne by the developer, whether private, commercial or a public authority.

If relocation is considered the only viable alternative then a new site should be established before the monument is dismantled. The existing structure should be carefully recorded and a detailed schedule for its movement, storage and re-erection should be drawn up. This should all be supervised and carried out by experienced professional contractors. Relocation can be a high-risk process as the true condition of the memorial and its internal fixings may remain unknown until the work begins.

11.3 Repointing

Mortar joints provide structural cohesion and prevent water ingress. Where they have failed as a result of erosion, cracking, separation or complete disintegration they must be replaced with new mortar that is well adhered, compatible with the stone, and of an appropriate colour, texture and profile. If the mortar is sound, it should not generally need to be replaced.

Methodology

Joints should be cut out with small hand tools rather than power tools, to a depth of a least twice that of the joint width. Dust and debris must be removed from the joint, preferably by blowing it out. Using water to remove loose material can cause it to run down and stain areas beneath the joint. Tools of an appropriate width (2mm less than the joint width) must be used for repointing so that mortar can be pushed right to the back of the joint. It should then be allowed to take an initial set before being scraped back to reveal the aggregate.

The joints of some memorials (for example on the steps of old churchyard crosses adapted for use as memorials) may be extensive and will require deep tamping. This involves the same processes as for other joints but using a drier mix mortar to fill the depth of the joint; the mortar should be well compacted using timber cut to the right width. Small packing pieces of pre-wetted stone pushed into the mortar can be used to help fill the void.

The mortar must be allowed to set in a controlled way by keeping it damp; depending on the environmental conditions, this should be for a minimum of 24 hours but can be several days or even weeks depending on the weather. Pointing work should not be undertaken when there is a risk of freezing temperatures.

Pointing between different materials (for example around a bronze plaque set on a stone backing) can be problematic because of differences in behaviour of the two substrates; this will lead to cracking, detachment and may encourage water ingress. A metal/stone interface is generally best left unfilled.

Mortars

Lime mortar is generally the best for all types of stone because it is flexible, permeable and has characteristics that can be varied to ensure compatibility with the stone. Pointing mortars can be successfully formulated with non-hydraulic lime putty (un-gauged or gauged with additives to aid curing or provide additional strength) or hydraulic lime binders (usually NHL 2 or 3.5, but on occasion NHL 5 for durable stones in exposed conditions). These should be mixed with sand and crushed stone in a typical ratio of 1 part binder to 3 parts aggregate by volume. The type of binder will depend on the type of stone or brick, its condition and the degree of exposure. Matching the colour and texture depends on using aggregates compatible with those in the original mortar and obtaining the right surface finish. Cement should not be used as a binder as it is too strong and impermeable for use with stone and brick; it will tend to crack away from the substrate and allow water ingress.

11.4 Consolidation

A consolidant is used to restore cohesion and physical strength to deteriorating material and can be applied to porous materials such as stone, brick and concrete. Consolidants are formulated to work with particular types of substrate, for example lime-based materials on limestone or silicon-based products (silanes) on sandstone. They are normally prepared by dissolving the solid material in a solvent to produce a low-viscosity liquid that is then applied in a series of layers in order to achieve sufficient penetration. When the solvent evaporates, the consolidant is left within the substrate, ideally leaving the pore spaces open but with the matrix reinforced.

Consolidation is normally carried out as a last resort on decaying surfaces; it can provide sufficient strength to allow the application of other treatments such as mortar or surface protection. The decision to use a consolidant should not be taken lightly and only with the approval of a conservation professional. Application should always be carried out by an experienced conservator.

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Images 68–71

68. A section of stonework in which the joints have been thoroughly raked out. Correct tools have been used and there has been no damage to the stone. [photo © Odgers Conservation Consultants Ltd]

69: After the joints have been filled, the stone and mortar is regularly wetted to control the setting (carbonation) process. [photo © Odgers Conservation Consultants Ltd]

70. This memorial in Snelston is set within an octagonal paved area. It is a Grade II listed building and dates from c1920. When the paved area had become slippery and uneven, the steps and paving were lifted, relaid and repointed. The plinth and shaft were also re-pointed using lime mortar. [photo © Anthony Short & Partners 2010]

71. Deep pointing is often required where stonework is worn or irregular or when joints have opened over time. It involves filling the joint to full depth with mortar, perhaps including some shards of stone. Once the mortar has been filled to the surface, the drying and setting must be controlled and the surface left with aggregate exposed. [photo © Inspire Conservation Ltd 2013]

Any consolidant should:

- significantly improve the measurable properties of the decayed material
- have similar thermal and moisture expansion characteristics to the substrate
- allow for future re-treatment.

It should not:

- adversely affect the pore structure of the stone, nor the moisture transfer within it
- cause strong interfaces between treated and untreated areas
- significantly alter the colour, texture or surface reflectance of the stone
- encourage or support microbiological growth
- affect medium and long-term maintenance.

11.5 Surface repair

Deteriorated surfaces are not only aesthetically displeasing but can also be the cause of further decay. This can be reduced through the commissioning of surface repairs that allow for the original fabric to be retained without the use of more invasive methods.

Stone

Mortar repairs are an important part of the conservation of stone memorials because they can be used to fill voids (including water traps on horizontal surfaces) and provide protection for decayed areas of stone. Mortar colour and texture should be matched to that of the clean stone. The type of lime binder must be appropriate for the type of stone, its condition and its degree of exposure. Most stone repair mortars typically have a 1:3 ratio of binder to aggregate. The selection of appropriate aggregates is important, not only to ensure that the mortar has properties (such as permeability and strength) compatible with the stone, but also so that the mortar can closely match the stone in colour and texture.

The surface of the original stone needs to be clean and requires a key to allow the repair to adhere. Deeper repairs or those applied to vulnerable sections (such as mouldings) can be reinforced by inserting armatures; these are best made from inert materials such as ceramic or carbon fibre but stainless steel can be used as long as it is kept well back from the surface.

Shallow repairs (less than 10 mm) may require the removal of a small amount of original stone in order to provide sufficient depth and strength for the mortar. As with pointing, the application and curing of the mortar needs to be carefully controlled.

Metals

Surface repair of metals is not usually an appropriate response to corrosion. Minor pitting on bronze can be filled during routine wax polishing and larger holes may be filled with a hard wax. Small dents or losses in ferrous metals can be cold-filled with epoxy-based proprietary materials. Broken sections can also be brazed together by heating the surfaces to be joined and introducing a molten filler material.

Timber

There should always be a presumption in favour of repairing timber by inserting new sections of timber (see ‘replacement’ below). However, there are occasions when preservation of significant original features means that surface (and even structural) repairs are best carried out using epoxy resins. The resins are usually two-part, cold-curing gel or paste epoxy adhesives that allow gaps to be filled without shrinkage. The rigidity of the cured material, the tendency for resins to yellow in ultraviolet light and the possibility of condensation at the interface of timber and resin all need to be considered before deciding on such a course of action.

Brick

Bricks can be repaired in a similar way to stone. However, the mortar repairs are more difficult because, when using lime as a binder, it is difficult

to get a colour match without using pigments, which tend to migrate to the surface. causing changes in the colour of the mortar.

Concrete

Surface repairs to concrete can be carried out using cement as the binder and an aggregate chosen (usually after analysis) to match the original. The size of the patches of repair should be minimised and regular shapes should be avoided. Matching the surface texture of the original requires considerable skill but can be achieved by tooling, brushing or removing laitance (a weak, friable layer on the surface of concrete) while the repair is still wet. It is very difficult to get an exact match for concrete so it is important that samples are provided.

11.6 Replacement

Replacement of decayed or missing elements should only be considered when other repair options are not feasible, will not provide an appropriate long-term solution or when the absence will substantially affect the significance of the memorial (for example an inscription panel). Replacement must always follow established principles (such as using like-for-like material) and should only be carried out if there is sufficient physical or archival evidence available to ensure accurate replication of the detail. Replacements should always be carried out by experienced professionals.

Stone

Replacement of stonework can range from minor indents to significant elements. Missing or badly damaged parts of a monument should never be replaced just because they are weathered; replacement should only be for structural, safety or functional reasons (such as a weathering that is no longer shedding water). Replacing ('indenting') only the damaged section of the stone is preferable as this allows retention of as much original fabric as possible. However, if the damage is too great, complete replacement may be the only option.

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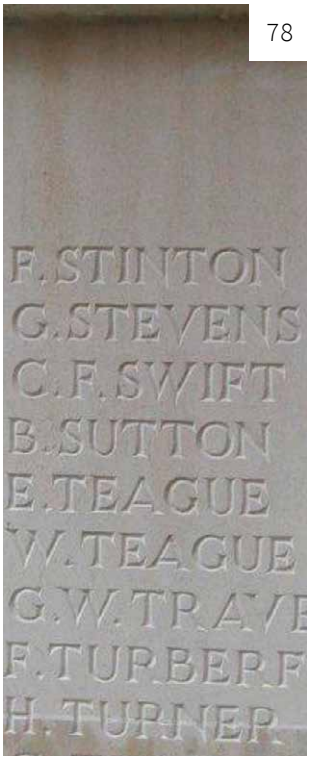
Images 72–74

72. Repair mortar is used primarily to protect decayed stone but may also require some modelling, as in this case where mortar has been applied to the nose and mouth.
73. The mortar repair on this cornice was reinforced and supported with a stainless steel armature. Unfortunately, the repair has failed due to the different physical characteristics of the metal and the mortar as well as the exposed and vulnerable location of the repair.
[photos 72 & 73 © Odgers Conservation Consultants Ltd]
74. In this instance, mortar was applied to stone before the indentation of the lettering. Because the repair is close to the ground, it has been affected by moisture and is now detaching.
[photo © Skillington Workshops]



Images 75–79

75. A step damaged by frost has been indented with new stone, the surface of which has been tooled to match the original. Whenever possible, it is good practice to respect original joint lines.
[photo © Elmore Parish Council 2012]

76. The replacement of a whole section of step. Note how the narrow joint widths match the original. The surface has been tooled to match the original. No attempt shoud be made to 'distress' new stone to reduce its visual impact.
[photo © Inspire Conservation]

77 & 78. The four inscription panels were badly eroded probably due to inherent defects in the original stone. It was therefore concluded that the most appropriate and long-term solution was to replace the panels rather than re-cut the lettering in the original.
[photo 77 © S Taylor 2009]
[photo 78 © S Taylor 2010]

79: A new timber base plate has been inserted to match the original.
[photo © Christopher Thomas 2009]

Materials used for replacements should be matched not only visually, but in terms of their physical and mineralogical characteristics; if the original stone is no longer available, then a stone should be chosen that has a close geological match. Compatibility with the original is more likely to ensure there are similar weathering characteristics.

Replacement stone elements and indents should be cut and finished to match the original, and not the weathered, profile. Installing the new piece may require some of the existing stone to be cut away to provide a sound base for fixing the new stone –this should always be designed to ensure that the minimum of original material is removed.

Indents are normally taken to at least one of the original joints of the stone. It is also better if the indent does not have a squared shape but follows the profile of the decayed section being cut out. Indents should be cut so as to have very fine joints (<2mm); they should be bedded in fine lime mortar and may need to be secured with stainless steel dowels.

Replacement of whole stones must respect the original joint widths and involve bedding in lime mortar. New stones should be finished with surface tooling to replicate the finish that was originally used on the adjacent stonework. New stone should not be tooled to appear weathered as it will eventually weather naturally to match the existing stone.

Bronze

Bronze elements can be replaced and this is most likely to be necessary as a result of theft. Any replacement should follow the original as closely as possible in mode of manufacture and surface patina. It is usually recommended that new bronze inscription panels susceptible to theft include identification on the rear as an integral part of the cast; this form of marking is not suitable for sculptural elements. New sections will tend to weather differently to the original and may become more visible as time progresses.

Iron

Replacement of iron is more common than for other metals. Partly this is a result of railings, gates and other iron components being more liable to theft and physical damage but also because some were appropriated for other uses during the Second World War. Railings and gates are made up of multiple elements joined together by welding, bolting or screwing. As a result, it is usually possible to replace individual components rather than the whole assembly. In many cases, however, the corroded sections of the iron can be treated, thus avoiding the need for replacement.

It will always be necessary to establish the nature of the original iron (for example a cast iron finial or a wrought iron rail) and to ensure the replacement is similar. Specific recommendations will need to be made by an experienced blacksmith or metal conservator and manufacture should use traditional materials and techniques.

Lead

The replacement of lead on war memorials tends to be restricted to the insertion of missing or damaged lead letters or the replacement of flashings and weatherings.

Letters will need to be replaced by experienced masons or letter cutters. The process involves cleaning out and perhaps redrilling the holes that are used to secure the lead. Code 2 lead is normally used as it is malleable enough to be cut to the approximate shape and then gently hammered against the stone so that the lead is pushed into the holes to provide the lug that keeps the letter in place. The lead is then finished by cutting to the correct shape.

Timber

Sections of timber may need to be replaced if the decay is affecting the structural stability of the memorial. These repairs fall into two categories: face or patch repairs and whole section repairs. In most cases, the former will be the most appropriate; this involves cutting out decayed areas and inserting and securely fixing new (matching) timber. One of the problems with such repairs is that they often move differently to the weathered host timber, thus allowing water traps

Images 80–82

80. The weathering of the Portland stone has affected the legibility of these incised inscriptions. It was decided not to re-cut the lettering or indent new pieces of stone as this would have had a negative effect on the overall appearance of the memorial. Instead, the memorial was cleaned, repointed and then treated with limewater and a lime-based shelter coat.
[photo © Swanbourne Parish Council 2011]

81. The Cenotaph in Bristol is susceptible to algae staining because of its proximity to trees. It is regularly maintained by cleaning with steam and applying a lime-based shelter coat.
[photo © Odgers Conservation Consultants Ltd]

82. Hot wax coating applied after cold patination using dilute potassium sulphide over the naturally formed, stable green patina, converting the green patina to dark brown.
[photo © Rupert Harris Conservation Ltd]

to form; they may also become visually intrusive. In some cases (for example the rotted base of a Calvary cross), it may be necessary to connect a new full section to the old using a scarf joint. This will need to be moulded and finished to match the existing work. Jointed timber will never be as strong as a single piece so the type of joint must be designed to satisfy structural needs.

It is always worth considering methods of preventing water ingress into timber even if this means a minor change to the original detailing. For example, lead flashing may be required at a timber-to-stone joint.

Brick

Any decision to replace bricks should take into account the degree of damage to the originals, and the effect it is having on the surrounding brickwork. The quality of the replacement brick and its visual contrast with the old will need to be considered. Against these factors might be set the fact that although the face of the brick may have weathered back several millimetres, this may not pose a problem of long-term survival.

When there is no alternative to replacement, the old brick should be removed by drilling and chiselling using minimum percussion in order not to disrupt adjacent bricks. Once all mortar and debris has been removed from the void, the surfaces (of both void and brick) should be wetted. The back of the void and the bottom and side beds are laid with mortar and then the replacement brick inserted. The amount of mortar must be sufficient to maintain the joint width.

11.7 Surface treatments

Surface coatings, whether visible (eg paints) or invisible (eg wax), are used to protect surfaces from weathering or to enhance or homogenise their appearance. In many cases, however, the treatment is not beneficial to the long-term survival of the substrate. All surface treatments require maintenance. As with other practical interventions, works should always be carried out by those with an appropriate level of skill and experience.

Stone

Surface treatments for masonry, such as water repellents, sheltercoats and graffiti barriers are intended to provide a protective layer to vulnerable material. Modern water repellents (eg silanes, siloxanes and fluoropolymers) have been effective in controlled environments but are not generally suitable for external use. There are many products on the market that claim to protect stone and be 'vapour permeable' and 'breathable'. However, they do not allow liquid water to pass and this has often led to greater damage in the long term. They should not be used on war memorials except in special circumstances and only after they have been specified by a conservator and subject to site trials.

More traditional masonry protectants, such as limewash (lime putty coloured with lime-fast pigments, diluted with water) and sheltercoat (lime putty and finely ground aggregates, diluted with water) provide a sympathetic and sacrificial layer for limestone. Limewash covers the surface and therefore changes the appearance but sheltercoats aim only to fill the surface pores and should provide a harmonious appearance similar to the underlying stone. They must be carefully formulated to match the stone and must be correctly applied to a clean substrate and allowed to carbonate in a controlled way. Over time, the sheltercoat will weather down and in most cases it will need to be reapplied periodically; this must be incorporated into any maintenance regime.

Permanent anti-graffiti coatings have been found to cause problems for porous surfaces because they slow down water evaporation, thus increasing the potential for salt damage and causing colour change. Sacrificial graffiti barriers (based usually on microcrystalline wax) are easier to remove than permanent coatings. If a memorial has been treated with a sacrificial coating, the graffiti and the coating can be removed by cleaning with low-pressure super-heated steam. The coating can then be reapplied although there is evidence that traces of earlier coatings may survive the cleaning process and lead to a build-up of material after successive re-treatments.

In only a few very extreme cases should paint be used as a surface coating on stone; specialist paints are available for historic stone, but should only be recommended and applied by a conservator.

Bronze

Bronze, if unprotected, slowly develops a green patina that is relatively stable and semi-protective. But in many cases, the bronze surface will have been artificially patinated using chemicals to produce particular aesthetic effects; often this will highlight certain features such as raised lettering on an inscription.

All forms of patination were traditionally protected with oil or wax, which would need to be re-applied regularly. To produce a uniform polished surface to bronze it became a common practice to apply a mixture of lanolin and white spirit, which was often blended with lamp black pigment. Lacquers and paints have also been used but these are more difficult to maintain or remove and are not recommended. In general, bronze elements of war memorials should always be protected with microcrystalline wax after gentle cleaning with warm water and non-ionic detergent.

Artificial repatination may need to take place if the surface has been affected by active corrosion but this requires great skill. Appropriate methods of repatination include tinted wax and chemical over-patination. Inappropriate methods include bronzing powder and solution. Research should be undertaken to see if it is possible to identify the original intended colour. Where there is no evidence of the original intention, then repatination should not normally be carried out.

Iron

The iron components of war memorials will usually have been painted. Once this has deteriorated (usually by flaking off), reapplication can only take place after the surface has been prepared. The appropriate cleaning method will depend on the type of iron, the nature of the coatings and the degree of corrosion. It is not usually appropriate to remove all the historic coatings back to bare metal. However, if that is

required, it will normally involve dismantling the ironwork. Refined paint systems for iron are available but a common choice is for products based on micaceous iron oxide, which produces a very watertight paint film. Specific recommendations will need to be made by an experienced craftsman or conservator.

Lead

Old lead lettering can develop a pale grey surface which can make the lettering hard to read. In such cases, patination oil can be applied. This can also be used to tone down new lead lettering while the natural lead carbonate patina has time to form.

Concrete

Concrete surfaces can be protected with paints, anti-carbonation coatings or sealants. All of these should help to reduce water ingress and paints will also hide any surface imperfections. However, coatings may also trap water within the concrete and they can also cause a change in appearance. Decisions about their use need to be based on assessment of any change against the possible extension of the lifespan of the concrete. All treatments will require regular maintenance.

11.8 Re-lettering

The inscriptions on war memorials are of paramount significance, so keeping a separate record of them is very important. War Memorials Trust and the Imperial War Museum recommend that a record of inscriptions and names be taken whether or not there is a problem with legibility; a copy of the transcribed inscription should be added to War Memorials Online.

While it might be comparatively easy to justify the replacement of illegible inscriptions, the arguments for replacing or enhancing partially legible inscriptions are more complex. Each situation will have to be treated on merit and there are a number of options available. These apply principally to stone inscriptions, which are the ones that are most likely to suffer problems of deterioration and illegibility. In general, decisions on the way forward should be taken after the inscriptions have been cleaned using the appropriate techniques (see Section 12 – Cleaning).

- **Legibility is affected by microbiological growth or other surface deposit.** If the letters are in good condition beneath, gentle cleaning should increase the legibility sufficiently; this should always be the first stage and subsequent decisions only made after cleaning has been completed.

- **Majority of letters are legible although slightly weathered.** Even though a few individual letters may not be clear, the inscription may be legible overall. No work should be necessary although the names should be recorded for future reference.

- **Many of the letters are losing definition but the inscriptions are still legible.** Consideration should be given to slightly sharpening the letters but not to totally recut them since recutting can only take place once.

- **Stone is continuing to decay and causing the inscriptions to become illegible.** A first step should be to identify the causes of the decay and carry out any necessary repair to the stone. Lettering could then be recut as long as there is a record of the names.

- **Stone has decayed beyond repair and inscriptions are lost.** In this case, it will be necessary to replace the whole panel (including the inscriptions) as long as there is a good record of the names. In no circumstances should the new panel be fixed over the decayed panel. If the original stone is no longer available and the design would be compromised by including a different stone, then the original inscription panel may have to be left in place and the names recorded elsewhere in a local amenity (for example the church or town hall) or by making a new plaque that can be set in the vicinity (for example on an adjacent wall).

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Images 83–85

83. Detail of repainted lettering; there are small holes in the incisions that indicate that this was originally lead lettering. In most cases it is recommended that re-lettering should follow the design and nature of the original but the theft of lead sometimes makes repainting an appropriate (and temporary) solution.
[photo © Odgers Conservation Consultants Ltd]
84. An example where lettering is slightly eroded but still legible.
[photo © War Memorials Trust 2009]
85. There are many alternatives to re-cutting lettering or replacing panels. In this case, the memorial has been conserved and the details of those commemorated has been recorded on glass panels set adjacent to the immediate surrounding of the memorial.
[photo © Paul Goodwin 2012]

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Images 86–88

86. Work in progress: touching in lettering to enhance the legibility of the names.
[photo © Humphries & Jones]

87. Incised lettering is susceptible to becoming illegible through lichen growth on the stone surface. However, the underlying stone is likely to be in good condition so no decision on the treatment of lettering should be taken until it has been properly cleaned. This cleaning should itself only be undertaken after a thorough assessment of the benefits and any adverse effects.
[photo © Inspire Conservation Ltd 2012]

88. Lettering being regilded; size is carefully brushed onto the incised lettering and then gold leaf applied using a soft brush.
[photo © Taylor Pearce Ltd]

Techniques

If a decision has been made to recut letters, then the original style should be reproduced. This will require careful setting out and execution and should always be done by an experienced letter cutter. Since original inscriptions will have been cut by hand, pneumatic and abrasive power tools should not be used. If lead lettering is missing, this can easily be replaced by a suitably experienced professional.

In cases where the design or execution of the lettering is part of the significance of the memorial (for example the work of a famous letter cutter like Eric Gill or high-quality letter cutting even if unattributed to a named artist) it can be conserved by consolidation and repair. Although final decisions depend on assessing heritage values, recutting or enhancing such lettering would normally not be considered. The names should be recorded elsewhere.

Painted or gilded lettering

If the letters are painted or gilded and the underlying material is sound then retouching, repainting or re-gilding can be carried out by a qualified professional.

Letters can be reinstated using a suitable paint, such as acrylic (reversible), enamel or oil. It is not always necessary or desirable to paint the inscription in its entirety and just touching in decayed areas can be sufficient to make it legible. Whichever medium is chosen, painting must be carried out with due regard for the surface, the style of lettering and the original paint. If the edges of the incisions are softened, then it is important that the paint does not bleed and become smudged. Gilded lettering should never be retouched using gold paint.

12 Practical Conservation Treatment – Cleaning

12.1 Reasons for cleaning

Cleaning is a complex issue. It involves both aesthetic and technical considerations and should be viewed as a major intervention. For this reason, it is important to seek the advice of a qualified conservator or other conservation specialist. Although light cleaning of sound stone with a bristle brush (non-metallic) and clean water is unlikely to cause damage and could be carried out by a volunteer, it is strongly recommended that any other cleaning of a war memorial should only be carried out by experienced craftsmen or conservators.

As a general rule, memorials should be cleaned primarily for technical reasons – for example to remove soiling which is causing damage to the historic material or to allow further treatment to be carried out. The aim of cleaning is not to return the memorial to a 'like new' appearance, but to safely remove particulate deposits, staining and biological growths. A balance has to be struck between accepting the inevitable effects of the passage of time and maintaining a dignified and cared-for appearance. Inscriptions are a more legitimate subject of cleaning, especially if it increases their legibility, although this should not be taken as a licence to clean all areas of a memorial.

12.2 Cleaning strategy and trials

An appropriate cleaning strategy is one that uses the mildest and least damaging methods to achieve the desired cleaning effect, while minimising any alteration of the underlying material. The method should be controllable (both in practical and health and safety terms) and must not deposit by-products (for example detergents) that cannot be completely removed.

War memorials are at the heart of community commemoration and it is not surprising that the cleanliness of a memorial is associated with the degree of respect to those commemorated. However, even quite gentle regular cleaning of stonework can result in increased exposure of the surface pores of the stone; this provides a suitable location for pollutants to collect and biological growth to take root. As a result, the memorial gets dirtier more quickly and a more frequent cycle of cleaning can become established.

Appropriate cleaning requires correct evaluation of:

- the nature of the material, eg the mineralogy of the stone, the type of metal
- the condition of the material
- the nature and extent of soiling
- the biodiversity and importance of biological growth including lichens, mosses and algae, some of which are protected by law

Initial cleaning trials, carried out in a discreet part of the memorial, are essential, not only to demonstrate the effectiveness of the options but to manage expectations by showing what result cleaning can achieve. The least abrasive and invasive methods should be trialled first before resorting to more aggressive methods. In practice, more than one method may be appropriate for different types of soiling and substrate.

12.3 Cleaning methods

Decisions on appropriate cleaning methods are determined on the basis of the considerations above. Table 2 provides summarises the range of materials to be found on war memorials and a selection of possible cleaning methods.

In all cases, operatives must have experience of using the methods, equipment or chemicals on weathered historic surfaces because inappropriate cleaning can cause irreversible damage. All proprietary methods and materials must be used according to the instructions of the manufacturer or supplier. Some methods may require subsequent rinsing or neutralising.

Cleaning method		Materials											
		Stone					Metal				Timber	Brick	Concrete
		Limestone	Sandstone	Marble	Slate	Granite	Bronze	Brass	Iron	Lead			
Water washing	Brushing with water	●		●	●	●	●	●			●		●
	Mist spraying	●		●	●	●						●	●
	Low pressure washing				●	●			●				●
	Steam	●		●	●	●	●		●	●		●	●
Mechanical	Hand-held	●	●	●	●	●	●	●	●	●	●	●	●
	Dry air-abrasive	●	●	●	●	●			●			●	
	Wet air-abrasive	●	●	●	●	●			●			●	
Chemical	Acid		●		●							●	
	Alkali	●	●		●	●					●		●
	Organic solvents	●	●	●							●		
Poultices		●		●	●	●					●		●
Special	Laser	●	●	●	●	●					●		●

Table 2
Methods for cleaning.

Water washing

Water is an effective solvent and some form of it can be used for cleaning most substrates. The most common applications of water are:

- **Brushing with water.** This is effective at removing water-soluble dirt from many substrates although it is ineffective with sandstone and most types of brick. Brushes should be made from bristle or nylon (not wire) and must not scratch or abrade the surface. Water should be clean and a sponge used to collect any run-off. For bronze and brass a lint-free or microfibre cloth can be used with water; the surface is then wiped off with a dry cloth.

- **Mist spraying.** This involves the application of water using anything from hand-held atomised sprays to automated nebulous spray rigs that spray water onto the surface for a short period (usually 5–30 seconds) with a longer interval between (usually 5–10 minutes). The method allows for a minimum of water to be applied and it is particularly useful for dirt that requires softening over a period of time, for example black crusts on limestone, brick and concrete.

- **Low-pressure washing.** This is useful for smooth, sound, lightly soiled surfaces such as those of granite, iron and concrete. For memorials, pressures should normally not exceed 20 bar. Even at these low pressures, the nozzle should be kept at least 20cm from the surface. It is easy to cause damage with pressure washers (even domestic ones) so they should only be used on a memorial by an experienced operator. They can, however, be used by volunteers to remove slippery algae or organic growth from sound paving slabs.

- **Steam.** Commercial steam cleaners generate a combination of superheated water and steam with a typical temperature of 120–150°C, a flow in the range of 3–10 litres per minute and a nozzle pressure of 30–150 bar. Although this is similar to hot water pressure-washers, the use of an atomizing nozzle that diffuses the jet of steam results in a very low pressure at the surface being cleaned. There are also 'dry' steam cleaners that heat the water up to 180°C; these use much less water. Steam is particularly useful for softer organic deposits. Although effective for cleaning around lead lettering, care must be taken that the letters are not dislodged.

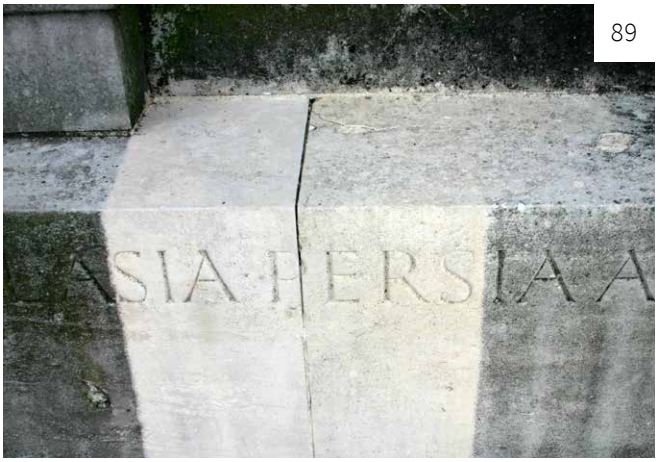
Mechanical

Most of the mechanical methods for removing a surface deposit can cause damage if used inappropriately or by inexperienced operators.

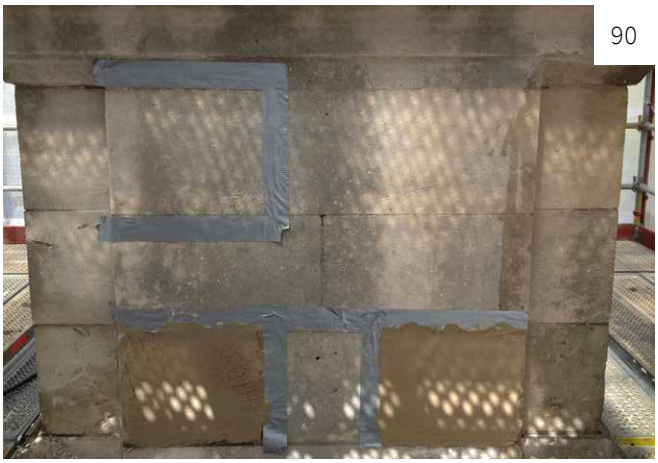
- **Hand-held.** These methods include vacuum cleaning, dry brushing, dry sponges and spatulas. The appropriate tool can be used to remove surface dust and debris from most materials. Localised corrosion on bronze can be reduced by careful cleaning with wire wool but this must always be carried out by a conservator. A wire brush can be used to remove corrosion products from iron.

- **Dry air-abrasive.** This method can be used for removing thicker or more tenacious dirt, especially if spread over a large area. The equipment consists of a compressor which forces air into a pot containing abrasive particles, and thence through a hose and nozzle. Units work at pressures anywhere between 1.5 and 6.8 bar, and vary from small machines suitable for delicate carved work (micro air abrasion) to more robust industrial units designed for cleaning larger areas. This method of cleaning must always be used by an experienced operator.

  Nozzle shape, pressure, flow rate, working distance, and the abrasive can all be varied. As a rule, pressures and quantities of abrasive should be kept as low as possible. The method can be used on iron (to remove corrosion and paint) and locally on bronze to remove green powdery pustules of active corrosion as well as at low pressures on most types of stone. It can, however, cause slight damage to the surface which may lead to accelerated decay or re-soiling. Sandstone is particularly vulnerable to such problems.



89



90

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Images 89–93

89. The result of a cleaning trial using superheated steam to remove algae. Low-pressure steam is generally the most appropriate method for removing soft biological material.
90. Cleaning trials in progress using various poultices to remove deep staining. The trials have been marked out and the poultice applied to complete stones. Assessment should always be carried out several days after the trial has been completed.
[photos 89 & 90 © Odgers Conservation Consultants Ltd]
91. An ammonia and clay-based poultice has been used to remove copper stain. After the poultice has been applied, drying out is controlled by the application of cling-film. Multiple applications may be required.
[photo © Humphries & Jones]
92. Steam cleaning in action; the splay of the nozzle and the distance it is held from the stone will depend on the type of stone and the nature of the surface soiling.
[photo © Inspire Conservation Ltd 2011]
93. High pressure steam cleaning (DOFF) to remove degraded wax, paint and loose corrosion products, prior to patination.
[photo © Rupert Harris Conservation Ltd]

- Wet air-abrasive. This method combines abrasive cleaning with water cleaning; the addition of water allows more control over the process. Wet air-abrasive systems used in conservation feed the abrasive and the water through separate hoses. A vortex nozzle then allows the aggregate to strike the wall at a shallow angle. This can allow more uniform and less aggressive cleaning. The method is widely used for cleaning black pollution crusts from stone and brick as well as active corrosion products from metals. Unless active corrosion (pitting, pustules and powdering) is present, wet abrasive cleaning methods should not be used on bronze as this will remove evidence of historic patina and can cause surface damage. Where it is used on bronze to remove pitting corrosion, this should be done locally with a suitably sized nozzle.

Chemical

There is a large range of chemicals that can break down the bonds between dirt or paint and the substrate. Decisions to use chemicals for cleaning will depend on the nature and condition of the substrate and there are many proprietary products to undertake specific cleaning processes. Chemical cleaners are usually supplied as gels or pastes and manufacturer's instructions must always be followed. Surfaces should always be well wetted before any chemical is applied, and thoroughly neutralised and rinsed down afterwards, perhaps with steam at low pressure. The length of time the chemical is in contact with the stone (which can be reduced by gentle brushing or agitation) and environmental conditions are also crucially important.

- **Acids.** These are normally based on low concentrations of a variety of acids. They can be effective for cleaning sandstone and brick (for example brick acid for removing calcite deposits) but can cause salts to form unless they are very well rinsed. The rinsing can introduce lots of water into the substrate, which may itself cause damage (for example leading to the expansion of clays in sandstone).
- **Alkalis.** These are more commonly used and form the basis for many commercial paint strippers. They should not be used on metals but are useful for dissolving black crusts from limestone and for removing applied coatings from timber. Alkali paint strippers are usually supplied in the form of a poultice. They are left in contact for up to 24 hours and prevented from drying out by being covered with polythene.
- **Organic solvents.** These include materials such as acetone and white spirit which are generally used for the localised removal of grease or stains from stone. Other solvents form the basis for non-caustic paint strippers.

Poultices

Poultices are a combination of chemical (including water) and support (such as clay, paper pulp, Fuller's earth or latex). They allow for controlled cleaning by increasing the contact between a chemical and the dirt; this allows for lower concentrations of chemical to be used. However, they must be carefully controlled and optimum contact times established through trials.

On war memorials, common poultices might be:

- **Ammonium carbonate.** A solution (around 10% concentration) usually mixed with sepiolite clay and paper pulp and used to dissolve black crusts from limestone.
- **Ammonium chloride and ammonia.** Mixed with paper pulp and Fuller's earth to remove bronze staining from porous stone.
- **Sodium citrate and glycerine.** Applied as a clay poultice to remove iron stains from porous limestones.
- **EDTA (ethylenediamine tetraacetic acid).** Usually applied as a gel or latex poultice to mobilise and remove metallic and other stains from most types of stone. The latex can be synthetic or natural and is normally stabilised with ammonia, which has its own cleaning effect.

Laser cleaning

This is a comparatively new method of cleaning. The equipment is expensive and requires great expertise. It works by firing pulses of high-energy light, which is absorbed by the dirt and then vaporises; it works best when there is a contrast between dark dirt and a pale substrate. It can be very carefully controlled and is therefore used in situations where the substrate is vulnerable.

Removing graffiti

Graffiti applied to smooth, glazed, impermeable, hard and resistant surfaces can be cleaned relatively easily. Greater problems are encountered with porous rough surfaces such as stone and concrete. The ease of removal will depend on the nature of the medium and the degree of bonding with the substrate.

Image 94

Surface biological growth can be removed by scrubbing with water; this is generally less effective than steam, the heat of which helps to kill the root systems of microbiological material. Also, the act of scrubbing can be damaging if the stone surface is soft or friable.
[photo © Simon Swann]

Graffiti removal involves the dissolution of a wide range of media, including spray paints, marking pens, wax crayons and lipstick. Cleaning is generally done with solvent-based paint strippers in conjunction with super-heated steam cleaners. This is sometimes followed by poultice application of organic solvents to eliminate deeper residues. At all stages, thorough rinsing to remove all traces of chemicals is essential. Removal should be carried out as soon as possible after the graffiti has been applied, since air and sunlight cause some types of graffiti to become considerably more difficult to dissolve. More details are given in the Historic England Technical Advice Note: *Graffiti on Historic Buildings and Monuments: Methods of removal and prevention.*

Treatment of biological growth on stone, brick and concrete

There should generally be a presumption against the removal of biological growths; most are harmless. However, they can obscure inscriptions and therefore justify limited cleaning. If assessment shows that treatment is appropriate and necessary, the simplest approach involves physical removal of thicker growths with wooden spatulas, followed by cleaning with water and non-metallic brushes or super-heated steam cleaners.

Growing concern for the environment has made the automatic use of biocides obsolete and untenable. Most modern commercial biocides are aqueous formulations of organo-halogen compounds, quaternary ammonium compounds, metallic salts or oxidizing agents.

Only products approved by the Pesticides Safety Directorate (part of the Health and Safety Directorate) may be sold, supplied, stored, advertised or used in the UK. The regulations also cover disposal. Only 'professional' products should be used in public or commercial situations and the application of such biocides must comply with the Conditions of Approval relating to their use. There are additional restrictions placed on the use of biocides in, or near, watercourses. Only certain approved products may be used and the Environment Agency has to authorise such use in each case.

Before even considering biocide use it is important to define what the actual problem is and what options there are for dealing with it – biocides should be the last solution considered. If treatment with biocides is considered the only option, it should be prepared according to the manufacturer's instructions and then carefully applied to the stone surface by trained operatives. It is left in contact with the stone for the recommended dwell time and the treated area covered with polythene. After several days, much of the dead biological growth can be removed through dry brushing with a stiff bristled brush. The process can be repeated and a final application left on the surface to prevent regrowth. Cleaning may appear incomplete at first, but improvement subsequently occurs as the most tenaciously attached plants, lichens or algae are gradually removed from the stone surface by weathering.

Re-formation of biological growths varies depending on the weather, type of stone, nutrients, pore structure and surface roughness. Some regrowth can be expected after 2–3 years but if there is a significant amount within 6 months, it is likely that the product was unsuitable for the task.

13 Commissioning and Undertaking Conservation Work

The method statement (see Section 10) will have identified what works are urgent, necessary or desirable. In some cases, the work will have to be prioritised due to lack of funding, so it is important that those elements identified as 'urgent' should be completed first. However, priorities must also take account of access requirements, so that if any scaffold has to be erected it is sensible to carry out all the works needed at high level rather than have to incur further access costs at a later date.

To obtain competitive quotations/tenders for the repairs, a clear description (schedule) of the works should be sent out to suitable contractors. For basic stone repairs and repointing a local mason may be appropriate as long as they have experience in working with historic structures and traditional materials such as lime mortar. It is always advisable to establish that the contractor has suitable skills and they should be asked to provide evidence of this. Organisations such as War Memorials Trust and Historic England cannot recommend particular contractors but the Conservation Register and the Building Conservation Directory have details of conservators and contractors that may be suitable (see Section 16 – Where to get advice). War Memorials Trust has published guidance on *Types of Contractors and their Roles* to help identify the appropriate type of contractor for your project.

Unless stated otherwise in the invitation to quote/tender, price will be the assumed criteria on which the tenders will be assessed and the preferred tender selected. The contractor submitting the lowest tender will be appointed to carry out the works subject to it being technically appropriate and in line with conservation best practice. It is also always worth taking into account the contractor's previous experience of similar work and any references. It must be made clear in the invitation to tender what criteria will be used to select the preferred tender including details of the weighting and scoring.

If public funding is involved, tendering processes are subject to procurement legislation and if more than 50% of the project will be publicly funded, Public Contracts Regulations (2015) is also involved. These requirements are likely to be included with the grant conditions from funding bodies especially for higher-value projects. Formal tendering processes are likely to require the input of an architect, surveyor or quantity surveyor; they should be able to advise as to what legislation will apply.

An invitation to tender letter should be sent out to potential contractors and should include the following:

- location of the works
- summary of the works
- method statement or schedule of works
- criteria for selection of contractor
- tender submission including fixed price for preliminaries (access, protection, security, disposal of waste, welfare facilities and conforming to all health and safety legislation), cost of works and VAT
- proposed start date
- request for statement of previous experience and two references
- request for statement of approach to the works and any amendments that the contractor would propose with itemised additional costs if appropriate
- tender return date.

Guidance to the tendering process and a suggested template for the invitation to tender is available on War Memorials Trust's website. It is worth remembering that work to historic structures is best done in the spring and summer and that there will usually be an ambition to complete works by Remembrance Day; as a result, contractors may get very busy in the weeks leading up to November.

Once a contractor has been selected, a pre-contract meeting should be held on site. This should involve all the interested parties including conservation professionals, client and, if necessary, representatives from local councils including the conservation officer. The meeting will need to:

- clarify the roles of those involved (including supervision)
- set start and completion dates
- ensure relevant licenses and statutory permissions are in place
- set payment terms
- confirm arrangements for security and preventing unauthorised access to the works area
- confirm where services (water, electricity) are available
- confirm what welfare facilities are required or are available
- ensure that all necessary health and safety requirements are understood and have been completed (for example risk assessments).

The work itself will require monitoring and, depending on the extent of the works, there may need to be interim inspections and meetings.

Image 95

Cleaning and repair work in hand on the Cenotaph, Whitehall during 2013.
[photo © Odgers Conservation Consultants]

14 Management and Maintenance of War Memorials

Management and maintenance of a war memorial requires that issues of ownership and responsibility have been clarified and any statutory protections that apply to the memorial are understood (see Section 4 – Legislation). It is good practice to draw up a 'Conservation Maintenance Plan' that includes photographs, condition surveys, risk assessments and any relevant method statements detailing what the maintenance works are, when they should be undertaken and by whom – all as described in this advice note. A maintenance plan of this kind is a tool that can help identify key problems and ensure the current and future upkeep of the memorial. Copies of this plan should be held by the custodian or owner and could be shared with other bodies.

14.1 Routine maintenance

Any war memorial should be inspected regularly, at least once a year. It is advisable to do this well before Remembrance Day so that there is time for any maintenance to be carried out. The condition survey template (prepared either by the person responsible for the memorial or by a conservation professional) will identify whether conservation or repair work is necessary but will also highlight any changes since the last inspection.

Although repairs should be carried out by experts, a great deal of regular maintenance can be done by those responsible for the memorial; even if the memorial is listed, these should not require any consent. They include:

- removal of leaves and other loose debris from accessible surfaces
- removal of bird droppings with wooden scrapers
- cutting back vegetation that grows on or around the memorial
- removing weeds from cracks in paving by hand
- making sure that wreaths are displayed appropriately and removed when necessary
- taking appropriate steps to guard against vandalism. This might involve ensuring

that any lighting is operating, checking that access arrangements are in place and cutting back trees that might obscure parts of the memorial (but check with the local authority whether any of them are protected by a Tree Preservation Order).

14.2 Theft

It is an unfortunate fact that even war memorials are occasionally the subject of theft and vandalism. The presence of valuable metals has meant that theft has recently been more prevalent. The metals are expensive to replace but may also carry inscriptions that are a precious and unique record, which is why recording them is an essential part of the management of a memorial. It may also be advisable to obtain insurance for the memorial.

The best ways of deterring theft and vandalism are through education and making sure that the memorial is well maintained and used.

A risk assessment should always be drawn up to:

- identify the value of the materials from which the memorial is constructed
- recognise the added art-market value of any of the memorial's components, especially those attributed to a famous artist or sculptor
- understand how easily valuable elements could be removed from the memorial
- consider ease of access both by foot and by vehicle
- work out what security is already in place (for example CCTV, lighting, signs)

Once the risk assessment has been completed, a plan of action should be drawn up to mitigate those risks. These might include increasing visibility of the memorial, installing additional fixings and encouraging local vigilance.

There are schemes that offer assistance in deterring theft. In Memoriam 2014 is a partnership between the SmartWater Foundation and War Memorials Trust that offers free SmartWater anti-theft marking to war memorial custodians. Details on such schemes are available from War Memorials Trust's website or see Section 16 – Where to get advice.

If metal theft does take place, replacement should in general be on a like-for-like basis but with the addition of further anti-theft measures, such as stronger non-ferrous fixings. If the theft is repeated, it may be necessary to consider replacing the metal in an alternative material. However, this should still involve traditional materials rather than modern resin replacements. An example would be replacing a stolen metal plaque with a stone one to match the existing stone type of the memorial.

14.3 Getting a war memorial listed

War memorials are poignant reminders of the human cost of war, and especially the First World War. Over the centenary years, 2014-18, Historic England will work with partners such as War Memorials Trust and its volunteers to greatly increase the number of memorials which are listed, to reflect the pride which communities have in them and to help ensure that repairs or alterations are careful and appropriate. Those which are judged to be at risk, notably from decay or neglect, will be priorities.

Historic England has a 'presumption in favour of listing all war memorials' that are commemorative structures unless they are compromised by alteration or are of little design interest (see Historic England *Designation Listing Selection Guide: Commemorative Structures*). Most memorials are listed as Grade II but those by noted designers and sculptors and of greater architectural interest may merit being listed at higher grades.

To be considered for listing, war memorials must fulfil certain criteria:

- they must be free-standing, which means that plaques attached to buildings are ineligible
- they generally must have been constructed over 30 years ago
- they should have particular architectural, historic or artistic interest
- any functional building erected as a memorial must be judged for listing against the criteria that exist for that particular building type (eg chapel, town hall, hospital).

Historic England has produced guidance for volunteers on how to get a war memorial listed. This guidance and other useful resources can be found at www.HistoricEngland.org.uk/listingwarmemorials

Image 96

Broomfield Park Garden of Remembrance in Palmers Green, London Borough of Enfield. All but two of the bronze plaques were stolen in 2009.
[photo © War Memorials Trust 2009]

15 Funding for War Memorials

Funding for all but the smallest projects is likely to need to draw on a number of sources. This may include private donations, grants, in-kind support and the resources of the group or organisation taking the initiative to carry out the work.

The starting point for any project is a sound estimate of the total amount of money required – the project budget. This might include:

- repair and other building costs
- professional fees
- project management costs
- VAT.

At the outset, these estimates may well be approximate because it will be some way into the process before competitive tenders are sought. It is important to include in the project budget all the costs that will be incurred.

Fundraising is almost always a challenge, but a rewarding one. The War Memorials Trust helpsheet *Fundraising for War Memorial Projects* provides useful guidance on running a fundraising campaign and covers the range of sources that are likely to be relevant. An appeal that aims at a diverse spread of potential sources of money is clearly advisable and most grant-giving bodies will expect to see some contribution from private donations or the applicant body's existing resources ('partnership funding' as it is known).

Local organisations, such as charitable trusts, are often a very good source of funding; details of these can be found in your local library. However, it is unlikely that all but the largest projects will need to pursue every possible lead.

It is a good idea to discuss and draw up a fundraising plan at an early stage in any project. There will be a variety of tasks and they will need to be shared out appropriately. The timetable for the project will need to be set so that the money or reliable pledges are in place by the time that work starts. Grant money and other contributions may not all come in at the start of a project. Some grants from public or charitable bodies are paid on completion of the work or in stages during the project. There will need to be plans for how bills that come in during the project will be paid. This usually means having a sufficient 'float'. If this is not possible then loan finance may be necessary.

There are a number of different grant schemes available for the repair and conservation of war memorials most of which are administered by War Memorials Trust. Through the Trust, the Government has also made significant sums available for war memorials across the country to be brought back into a fitting condition to mark the centenary of the First World War.

As a first step for any project a 'Grants Pre-application form' will have to be completed. War Memorials Trust will then use this information to direct applicants to the most appropriate grant scheme for their project. It is worth noting that none of the grant schemes administered by War Memorials Trust can fund retrospectively. The eligibility, amounts available and the timeframe for applications vary between schemes and change from time–to-time. Up-to-date information is always available on War Memorials Trust website: www.warmemorials.org/grants.

Larger projects should also explore the grants available from Heritage Lottery Fund (www.hlf.org.uk), bearing in mind that it will expect any project it supports to maximise access, engagement and educational benefits.

Projects carried out by registered charities or faith groups excepted from registering as charities may qualify under the 'Memorials Grant Scheme' (www.memorialgrant.org.uk) for a government grant covering all or some of their VAT costs. This scheme is currently only confirmed until March 2015. Details of other sources of funding can be found on War Memorials Trust website.

16 Where to Get Advice

16.1 General advice on war memorials

War Memorials Trust

2nd Floor
42a Buckingham Palace Road
London SW1W 0RE
Tel: 020 7233 7356 or 0300 123 0764
Email: conservation@warmemorials.org
Website: www.warmemorials.org

Historic England

1 Waterhouse Square
138–142 Holborn
London EC1N 2ST
Tel: 020 7973 3000
Email: GHEU@HistoricEngland.org.uk
Website: www.HistoricEngland.org.uk

Details of all listed memorials can be found at www.HistoricEngland.org.uk/listing/the-list

16.2 Historical research

Commonwealth War Graves Commission

2 Marlow Road
Maidenhead
Berkshire SL6 7DX Tel: 01628 634221
Website: www.cwgc.org

Public Monuments and Sculpture Association

70 Cowcross Street
London EC1M 6EJ
Tel: 020 7490 5001
Email: pmsa@btconnect.com
Website: www.pmsa.org.uk

War Memorials Archive

c/o Imperial War Museum
Lambeth Road
London SE1 6HZ
Tel: 020 7207 9851/ 9863
Website: www.iwm.org.uk/warmemorials

War Memorials Online

c/o War Memorials Trust
2nd Floor
42a Buckingham Palace Road
London SW1W ORE
Tel: 020 7233 7356 or 0300 123 0764
Email:info@warmemorialsonline.org.uk
Website: www.warmemorialsonline.org.uk

16.3 Conservation Professionals, Specialist Contractors and Conservators

Building Conservation Directory

c/o Cathedral Communications Ltd
High Street
Tisbury
Wiltshire SP3 6HA
Tel: 01747 871717
Email: info@buildingconservation.com
Website: www.buildingconservation.com

Conservation Accreditation Register For Engineers (Care)

c/o The Institution of Civil Engineers and the Institution of Structural Engineers
Email: registers@ice.org.uk
Website: www.careregister.org.uk

Conservation Register (for Conservators of Materials)

c/o Institute of Conservation
Unit 1.5 Lafone House
The Leathermarket
Weston Street
London SE1 3ER
Tel: 020 3142 6799
Email: conservationregister@icon.org.uk
Website: www.conservationregister.com

Conservation Register (for Conservation Architects)

c/o Royal Institute of British Architects
66 Portland Place
London W1B 1AD
Tel: 020 7580 5533
Email: conservation.register@riba.org
Website: www.architecture.com/conservationregister

Directory of Accredited Conservationists

c/o Chartered Institute of Architectural Technologists
397 City Road
London EC1V 1NH
Tel: 020 7278 2206
Email: info@ciat.org.uk
Website: www.ciat.org.uk/en/members/conservation-register.cfm

National Association Of Memorial Masons

1 Castle Mews
Rugby
Warwickshire CV21 2XL
Tel: 01788 542264
Website: www.namm.org.uk

National Association of Master Letter Carvers

c/o National Association of Memorial Masons (see above)

Register of Accredited Building Conservation Surveyors

c/o Royal Institution of Chartered Surveyors
Parliament Square
London SW1P 3AD
Tel: 0870 333 1600
Email: contactrics@rics.org
Website:www.rics.org/uk/join/member-accreditations-list/building-conservation-accreditation

Register of Architects Accredited in Building Conservation

AABC Register
No. 5 The Parsonage
Manchester M3 2HS
Tel: 0161 832 0666
Email: info@aabc-register.co.uk
Website: www.aabc-register.co.uk

17 References and Further Reading

17.1 Historic England

Historic England publications are available from www.HistoricEngland.org.uk/images-books/publications

- *Caring for Historic Graveyard and Cemetery Monuments* www.HistoricEngland.org.uk/images-books/publications/caring-historic-graveyard-cemetery-monuments
- *Conservation Principles, Policies and Guidance* www.HistoricEngland.org.uk/images-books/publications/conservation-principles-sustainable-management-historic-environment
- *Designation Listing Selection Guide: Commemorative Structures* www.HistoricEngland.org.uk/images-books/publications/dlsg-commemorative-structures
- *Graffiti on Historic Buildings and Monuments: Methods of Removal and Prevention* www.HistoricEngland.org.uk/images-books/publications/graffiti-on-historic-buildings-and-monuments
- *The Setting of Heritage Assets* www.HistoricEngland.org.uk/images-books/publications/gpa3-setting-of-heritage-assets
- *Understanding Place: Conservation Area Designation, Appraisal and Management* www.HistoricEngland.org.uk/images-books/publications/understanding-place-conservation-area

17.2 Practical Building Conservation

This series of fully illustrated books published by Ashgate provide detailed guidance on understanding, deterioration, assessment and care and repair.

- *Practical Building Conservation: Basics (2013)*
- *Practical Building Conservation: Building Environment (2014)*
- *Practical Building Conservation: Concrete (2013)*
- *Practical Building Conservation: Earth, Brick and Terracotta (forthcoming)*
- *Practical Building Conservation: Glass and Glazing (2012)*
- *Practical Building Conservation: Metals (2012)*
- *Practical Building Conservation: Mortars, Renders and Plasters (2012)*
- *Practical Building Conservation: Roofing (2013)*
- *Practical Building Conservation: Stone (2012)*
- *Practical Building Conservation: Timber (2012)*

17.3 War Memorials Trust

Conservation and management of war memorial landscapes www.warmemorials.org/uploads/publications/359.pdf

Condition Survey
www.warmemorials.org/conditionsurvey

Grants and funding
www.warmemorials.org/grants

Ownership of war memorials
www.warmemorials.org/uploads/publications/120.pdf

Preparing a method statement
www.warmemorials.org/uploads/publications/48.pdf

Researching the history of a war memorial
www.warmemorials.org/uploads/publications/122.pdf

Types of contractors and their roles
www.warmemorials.org/uploads/publications/383.pdf

A complete A–Z of War Memorials Trust helpsheets can be found at: www.warmemorials.org/a-z

17.4 Other Publications

Ashurst, N 1994 *Cleaning of Historic Buildings*, 2 vols. Shaftesbury: Donhead

Ashurst, J and Dimes, F eds 1990 *Conservation of Building and Decorative Stone.* London: Butterworth-Heinemann

BS 8221-1:2012 *Code of Practice for Cleaning and Surface Repair of Buildings Cleaning of Natural Stone, Brick, Terracotta and Concrete*, London, British Standards Institution

BS EN 459-1:2001 *Building Lime. Definitions, Specifications and Conformity Criteria*, London, British Standards Institution

War Memorial Condition Survey

Historic England

IDENTIFICATION

Name of War Memorial	Address/location
Type (e.g. cross, plaque)	
Designation (e.g. listed and grade)	Name and contact details of owner/custodian
War Memorials Trust Ref. No. (if known)	Local Planning Authority

HISTORY

Date of construction	Date of amendment (if any)	Designer/sculptor/architect/builder

Background information (e.g. if the memorial has been moved, recent repair work, structural monitoring, current planning applications)

DESCRIPTION

Type of inscription

- ☐ *Incised*
- ☐ *Incised and painted*
- ☐ *Incised and gilded*
- ☐ *Raised*
- ☐ *Leaded*
- ☐ *Bronze*
- ☐ *Metal plaque*
- ☐ *Other* _____

Principal materials (tick as many as necessary)

- ☐ *Stone*
- ☐ *Limestone*
- ☐ *Marble*
- ☐ *Sandstone*
- ☐ *Slate*
- ☐ *Granite*
- ☐ *Wood*
- ☐ *Brick*
- ☐ *Concrete*
- ☐ *Metal*
- ☐ *Bronze*
- ☐ *Brass*
- ☐ *Iron*
- ☐ *Lead*
- ☐ *Copper*
- ☐ *Other* _____

Brief description of memorial design and materials

SURROUNDING

Accessible

- ☐ *Always*
- ☐ *Restricted times*
- ☐ *By appointment*
- ☐ *Not accessible*

Condition of surrounding area

- ☐ *Good*
- ☐ *Overhanging trees*
- ☐ *Overgrown vegetation*
- ☐ *Cracked pavement*
- ☐ *Other* _____
- ☐ *Damaged railing/gates*
- ☐ *Damaged surrounding wall*
- ☐ *Litter/fly tipping*
- ☐ *Graffiti*

Further details

War Memorial Condition Survey *continued*

Historic England

CONDITION

Structural condition

- ☐ *Good*
- ☐ *Leaning (include angle)*
- ☐ *Displaced sections*
- ☐ *Movement*
- ☐ *Cracks*
- ☐ *Other* _____

Ground condition

- ☐ *Good/level*
- ☐ *Subsidence*
- ☐ *Eroded at base*
- ☐ *Tree roots*
- ☐ *Other* _____

Lettering/inscriptions

- ☐ *Good*
- ☐ *Fading/weathered*
- ☐ *Some illegible/missing*
- ☐ *Most illegible/missing*
- ☐ *Obscured by surface dirt/pollution*
- ☐ *Obscured by lichen/algae*
- ☐ *Obscured by graffiti*
- ☐ *Other* _____

Stone/brick/concrete

- ☐ *Good*
- ☐ *Loose elements*
- ☐ *Missing elements*
- ☐ *Cracked/missing pointing*
- ☐ *Surface dirt/pollution*
- ☐ *Staining*
- ☐ *Graffiti*
- ☐ *Delamination*
- ☐ *Decayed areas*
- ☐ *Eroded*
- ☐ *Organic growth*
- ☐ *Other* _____

Metal

- ☐ *Good*
- ☐ *Corrosion*
- ☐ *Staining*
- ☐ *Other* _____
- ☐ *Damaged areas*
- ☐ *Missing areas*
- ☐ *Unstable sculpture*
- ☐ *Loose elements*
- ☐ *Deteriorated paint/lacquer*
- ☐ *Loose/corroding fixings*

Wood

- ☐ *Good*
- ☐ *Loss of paint*
- ☐ *Splits*
- ☐ *Damaged areas*
- ☐ *Missing areas*
- ☐ *Rot/infestation*
- ☐ *Other* _____

Further details of condition

Photographs

☐ *Yes* ☐ *No*

Overall condition

☐ *Good* ☐ *Fair* ☐ *Poor* ☐ *Very bad*

CONTACT

Name of person carrying out survey

Address

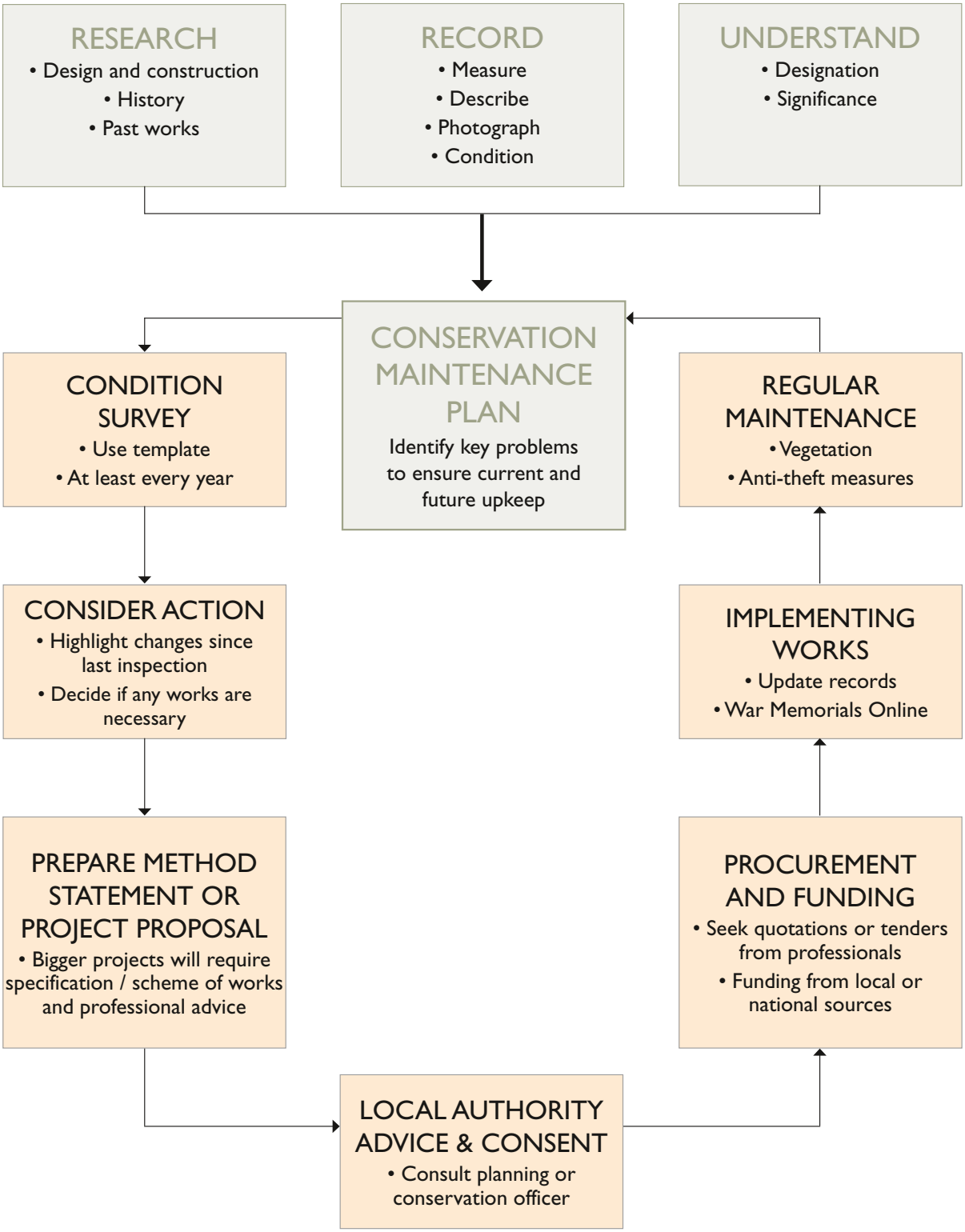
Organisation

Telephone No.

Email

Date of survey

War Memorials Care Cycle



17.5 Contact Historic England

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Historic England

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